The Effect of Ownership Level, Concentration and Owners' Identity on Market Liquidity in the UK Capital Market

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By

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Abstract

This study investigates the effects of ownership level, concentration and owners' identity on stock market liquidity in the UK. The study also examines the effect of the recent financial crisis on the relationship between ownership level, concentration, owners' identity and market liquidity in the UK. The sample includes 226 non-financial companies from the FTSE All-Share Index listed on the London Stock Exchange, over the period between 2003 and 2012. After controlling for two types of Endogeneity, i.e., simultaneity and unobserved heterogeneity, through the application and use of a pooled OLS year and industry dummies, this study finds the evidence suggesting that ownership level, concentration and owners' identity are important determinants of market liquidity in the UK.

The results suggest that insider ownership and ownership concentration are negatively correlated with market liquidity. In contrast, institutional ownership has been identified as positively correlated with market liquidity. While analysing the effect of owners' identity on market liquidity, it was revealed that executive and non-executive directors' ownership both decrease market liquidity. The findings also suggest that the existence of controlled shareholders (i.e., investment banks, government, pension fund, and foreign ownership) have a negative impact on firms' market liquidity. However, the presence of free float shareholders in a firm's ownership structure has a positive impact on market liquidity. As a result, this study regards the free float shareholders as uninformed investors whereas controlled shareholders and insiders are regarded as informed investors because they have access to a firm's private information.

After considering the effect of financial crisis, it was revealed that both the insider ownership and ownership concentration insignificantly negatively affect market liquidity in the pre-crisis, crisis and post-crisis periods of the recent financial crisis. However, institutional ownership had a significantly positive impact on market liquidity during the 2007-2009 financial crisis. With respect to insider identity, both executive and non-executive directors' ownership have a negative impact on market liquidity. Nevertheless, controlled shareholders (i.e., investment banks, government, employee, pension fund, foreign) ownership had an insignificantly negative impact on market liquidity, whereas free float shares had an insignificantly positive impact on market liquidity during the recent financial crisis. Keeping in mind the importance of market liquidity in the economy, it can be argued that the findings of this research have implications for the current and potential investors, policymakers and practitioners. As a result, the outcome of this study demands that firms should pay more attention to their ownership structure disclosure policy and improve quality of the disclosed information as much as possible.

Declaration

I hereby declare that the work and the material contained in this thesis are my own work. I further declare that no part of this work has been previously submitted for a degree qualification in this or any other university.

Majd Munir Mohammad Iskandrani

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Majd Munir Mohammad Iskandrani

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Dedication

It is with both pride and pleasure that this thesis is dedicated to my father, Munir Iskandrani (late, peace be upon his soul) and my mother, Samar AL Majali
With great respect; who always remain a source of inspiration. For everything I learned and achieved in my life

Chapter 1

An Overview of the Research

1.1 Introduction and Background

The last two decades have witnessed significant changes in the composition of ownership structure around the world. For instance, the UK has experienced a dramatic increase in institutional ownership of publicly listed companies. On the one hand, the ownership of UK shares held by individuals fell from 54% in 1963 to 11% in 2012. On the other hand, foreign investors who held just 7% of UK shares in 1963 held over 53% of UK quoted shares in 2012[1]. As a result, these changes in ownership structure have provided a reason for more corporate governance codes of practice to encourage institutional investors to take an active role in the monitoring process. For example, a recent study by Goergen et al. (2008) states that institutional blockholders in most listed UK firms do little company monitoring.

Moreover, the recent financial crisis of 2007-2009, which has been described as the worst of its kind since the Great Depression, also revealed weakness in the corporate governance mechanisms regarding institutional shareholder engagement in the monitoring process (Kirkpatrick 2009). In the light of the recent crisis, the Walker Review (2009) recommended the use of institutional Stewardship Code as the official UK code of practice for institutional investors. As a result, the UK Stewardship Code (2010) was established which strongly focuses on enhancing the level of engagement between institutional investors and companies to help enhance long-term returns to shareholders and the efficient exercise of governance responsibilities.

Furthermore, existing literature states that institutional investors seem to adopt a passive role towards monitoring and disciplining a firm's management (Maug 1998; Plender 1997). Prior studies have suggested that institutional investors rarely take action in corporate monitoring because they regard liquidity as more important than playing an active role in monitoring the firm's management (Bhide 1993; Coffee 1991). Moreover, institutional shareholders are blamed for their passivity and their focus on short-term rather than long-term returns during a crisis period (Chen & Poon 2007; Chu & Song 2010; Mitton 2002). Consequently, most corporate governance codes

[1] 'ONS (Office for National Statistics) report 2012'.

around the world emphasise the importance of institutional investors as one of the corporate governance mechanisms.

In the UK, the recent 2012 Stewardship Code aims to encourage institutional shareholders to play an active role in corporate governance mechanisms. In particular, the main aim behind the Stewardship Code (2012) is to increase the engagement activities of institutional investors, which require them to publicly disclose their commitment to a stewardship obligation or to explain their alternative investment approach if they are unwilling to assume such a commitment. Moreover, this code has emphasised that some institutional investors such as pension funds must take a more active role in the monitoring process.

A large body of ownership structure literature has focused on the composition and the structure of ownership in order to take into consideration the above-mentioned changes. In this regard, most of the existing literature has studied the relationship between ownership structure and board composition (Chung & Zhang 2011; Lemmon & Lins 2003; Singh & Davidson 2003). Other studies have examined the determinants of ownership structure (De Moura Costa et al., 2013; Lim & Kim 2005), ownership structure and executive compensation (Haid & Yurtoglu 2006; Mehran 1995). Similarly, there is also evidence on the effect of ownership structure on corporate performance (Demsetz & Villalonga 2001; Florackis et al., 2009; Kirchmaier & Grant 2004). Nevertheless, the relationship between ownership structure and market liquidity represents a heated topic of debate in the corporate finance literature. The existing literature regarding the effect of ownership level[2] on market liquidity focuses primarily on the effect of insider and institutional ownership on market liquidity (Chiang & Venkatesh 1988; Dennis & Weston 2001; Kini & Mian 1995; Rubin 2007). A vast body of research has argued that insider ownership leads to a wider bid-ask spread, which reduces market liquidity (Glosten & Milgrom 1985; Grossman & Stiglitz 1980; Kyle 1985). However, institutional investors tend to hold large stakes of capital for trading purposes that may have a positive impact on market liquidity (Gompers & Metrick 2001; Hamilton 1978; Schwartz & Shapiro 1992; Tinic 1972).

In addition to ownership level, another strand of literature suggests that ownership concentration may affect market liquidity. Previous literature has focused mainly on the ownership concentration-liquidity relationship (Bhide 1993; Bolton & Von Thadden 1998; Holmstrom & Tirole 1993; Maug

[2] Ownership level is the aggregate percentage of holdings for insider and institutional investors (Rubin 2007).

1998). These studies argue that there is a trade-off between liquidity and control. For example, Bhide (1993) mentions that active shareholders who reduce agency costs by providing internal monitoring also reduce market liquidity by creating an adverse selection problem in the capital market. Nevertheless, extant empirical studies have reported mixed results about the effect of ownership concentration on market liquidity (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010). For instance, Heflin & Shaw (2000) and Jacoby & Zheng (2010) find a negative impact of blockholders on market liquidity, which supports the notion that blockholders have access to private and value-relevant information. In contrast, Brockman et al. (2009) conclude that blockholders have no impact on information costs of market liquidity.

Despite many valuable insights that earlier theoretical and empirical studies provide, recent studies have used different proxies for ownership concentration in order to determine the exact direction of the relationship between ownership concentration and market liquidity (Jacoby & Zheng 2010; Rubin 2007). For example, Rubin (2007) uses different measures of ownership concentration such as the blockholders and the top five non-insider institutional investors; he argues that one advantage of the latter measure is that it is not subject to the arbitrary inclusion cut-off point of 5%. In addition, Jacoby & Zheng (2010) believe that blockholders ratio can be a poor measure of ownership concentration when considered exclusively and that it does not fully reflect ownership concentration. Therefore, unlike other studies that use the blockholders as sole measure of ownership concentration (Brockman et al., 2009; Heflin & Shaw 2000; Kini & Mian 1995), this study uses two measures of ownership concentration, blockholders and top five non-insider institutional investors.

Nevertheless, most of the above-mentioned studies have investigated the association between ownership concentration and market liquidity and have largely ignored the effect of owners' identity on market liquidity. For instance, the relationship between institutional blockholders' identity and market liquidity is a widely controversial issue (Barabanov & McNamara 2002; Naes 2004; Poon et al., 2013). Barabanov & McNamara (2002) state that institutional ownerships'identity has different impacts on market liquidity. For example, independent investment advisors' ownership has a more significantly negative impact on bid-ask spread than banks and insurance companies' ownership. Moreover, Naes (2004) mentions that the impact of larger non-financial investors has a more negative impact on relative bid-ask spread than other investors. In the UK, the proportional ownership of foreign investors has increased dramatically in recent years and has recently reached above 41%. Moreover, UK institutional investors – such as

insurance companies and pension funds – now hold around 26% of the total capital (ONS 2010, p. 4). Consequently, this study expects that the owners' identity of institutional blockholders will play a different role in market liquidity in the UK capital market.

Furthermore, the break-up between executive and non-executive directors' ownership is also important from the perspective of UK corporate governance codes (Cadbury 1992; Greenbury 1995; Hampel 1998; Higgs 2003). These codes have enacted a major role in enhancing the usefulness of UK boards of directors. In particular, the Cadbury Report (1992) and Higgs Review (2003) call attention to the distinction between executive and non-executive directors, and that share ownership by non-executive directors remains generally low, although it has been steadily increasing since the 1990s (Mura 2007). In contrast, executive directors are considered as the second-largest shareholder class in the UK (Florackis & Ozkan 2009). Thus, this study separates the effect of executive and non-executive directors' ownership on market liquidity in the UK capital market.

Consequently, this study uses the changes in the ownership structure in the late 1990s and early 2000s as a step that can potentially help us better understand how changes in investor composition could influence market liquidity. Moreover, as mentioned above, the last two decades have witnessed a number of reforms, which has resulted in lower transaction costs and have made the London Stock Exchange (LSE) more attractive for foreign investors. As a consequence, the fraction of LSE equities held by foreign investors increased by more than 50% in 2012. Nevertheless, it is difficult to state whether foreign investors are better informed about a firm's private information than domestic investors in the UK (Park 2009). There are clear disadvantages associated with operating in a foreign culture; however, despite the difficulties associated with analysing foreign companies, there is evidence that some larger foreign investors may be better informed about a firm's future prospects (Hamao et al., 2010).

1.2 Motivations of the Study

In the aftermath of the recent financial crisis, the importance of market liquidity as an important aspect for financial stability in the capital markets has received an extensive amount of attention from researchers and regulators. For instance, the Economist (1999) highlighted the relevance of market liquidity, as "*the possibility that liquidity might disappear from a market, and so not be available when it is needed, is a big source of risk to an investor".* In this regard, one of the most

important determinants of market liquidity is ownership structure, which has received little attention in the existing literature. For instance, Rubin (2007, p. 219) describes studying the ownership structure in relationship to market liquidity as "*An unresolved area in the field of finance is the relation between share ownership structure and liquidity".* By reviewing a large body of ownership structure literature, it is clear that ownership structure has been extensively studied with corporate performance (Demsetz & Villalonga 2001; Florackis et al., 2009; Kirchmaier & Grant 2004), while only a few studies take into consideration how ownership structure is related to market liquidity.

As mentioned above most prior ownership structure studies have focused mainly on corporate performance and has paid little attention to market liquidity. In the existing literature on the relationship between ownership structure and market liquidity, some studies have focused on insider ownership (Chiang & Venkatesh 1988; Comerton-Forde & Rydge 2006; Dennis & Weston 2001; Kini & Mian 1995; Rubin 2007; Sarin et al., 2000; Zhou 2011). Other studies have examined the relationship between institutional ownership and market liquidity and have ignored insider ownership in their analysis (Barabanov & McNamara 2002; Blume & Keim 2012; Fehle 2004; Poon et al., 2013). Similarly, other recent studies have focused mainly on ownership concentration and have ignored ownership level in their investigations (Attig et al., 2006; Brockman et al., 2009; Ginglinger & Hamon 2007; Heflin & Shaw 2000; Jacoby & Zheng 2010; Naes 2004).

Nevertheless, it can be argued, that owners' identity seems to be important in ownership structure studies. The existing literature has largely addressed the effect of owners' identity on corporate performance (Claessens & Djankov 1999; Klein et al., 2005; Pedersen & Thomsen 2003). These studies indicate that different owners will have different objectives, and it is likely that the identity of owners will matter to a firm's performance. For example, managers of corporations under governmental control may have different incentives and will behave differently to managers of corporations in the private sector (Klein et al., 2005). For this reason, ownership concentration and the identity of owners are those variables that exert a simultaneous, but different, influence on firm performance.

However, with respect to market liquidity, to the best of the author's knowledge very few studies have examined the relationship between owners' identity and market liquidity, which further indicates a clear gap in the literature. In contrast, one of the most striking differences between countries' corporate governance systems is in the ownership and control of firms, and the identity

of controlling shareholders. Moreover, this study is also motivated to investigate the impact of executive and non-executive directors' ownership on market liquidity. This relationship is weakly addressed in the literature since the focus of existing literature is mainly based on the aggregate level of insider ownership and market liquidity (Chiang & Venkatesh 1988; Comerton-Forde & Rydge 2006; Kini & Mian 1995; Zhou 2011).

In addition, the majority of the above-mentioned studies are based on the US market, and it is difficult to generalise the findings of these studies to other countries such as the UK. The differences in regulations, disclosure and governance practices justify the need for more research in this area for the UK. For instance, there are clear differences in the disclosure requirements of ownership structure between the UK and the US. In particular, the disclosure requirements in the UK are narrower than the US. For example, in the UK, blockholders who hold 3-5% or more stock of a public limited company are required to disclose the increase in their holdings if the magnitude of the change goes above 1-5% of stock within a period of 2-5 days. In contrast, the US disclosure rules require blockholders to report their increase in holdings within 10 days of the acquisition of a 5% holding, with changes of 1% or more thereafter (Short & Keasey 1999). Moreover, it is important to note there is a difference in the definition of insider between the UK and US. For instance, Fidrmuc et al. (2006) state that, in the US, insiders are defined as officers, directors, other key employees and shareholders with more than 10% of any equity class (Lakonishok & Lee 2001). However, the UK definition of insider is stricter; it includes the members of the board of directors (both executives and non-executives), and excludes other key employees and large shareholders. As a result, this study expects to find a clear difference in the relationship between ownership structure and market liquidity from a UK perspective.

Furthermore, Short & Keasey (1999) and Guest (2008) among others indicate that the UK and the US have an active market for corporate control but it is stronger in the UK. It is also important to note that the concentration of institutional ownership in the US is lower than that in the UK. Moreover, institutional investors in the UK are mainly pension funds and insurance companies and play a more active role in monitoring on the board, while in the US, institutional investors are mainly mutual funds that face legal restrictions, which results in a lower monitoring role on the board (Short & Keasey 1999). Taken together, it is obvious that several differences exist between the UK and US economies. In general, the differences are mainly related to ownership structure, market for corporate control and other regulatory and disclosure requirements. Consequently, it will

be appropriate to use country-specific data to examine the effect of ownership structure on market liquidity in the UK.

In the context of the 2007-2009 financial crises, few studies have focused on the effect of the ownership level, concentration and owners' identity on market liquidity. In this regard, Poon et al. (2013) state that institutional investors tend to sell their shares during the crisis period, which produces a negative impact on market liquidity. In particular, prior studies have documented that highly leveraged institutional investors have the ability to sell their shares more speedily than other types of investors, such as banks and hedge fund investors, during a market downturn (Gatev & Strahan 2006; Brunnermeier & Pedersen 2009). Thus, this study examines the relationship between ownership level, concentration, owners' identity and market liquidity for the UK firms in three sub-periods. These periods are pre-crisis period (2004-2006), crisis period (2007-2009) and post-crisis period (2010-2012).

1.3 Objectives of the Study

In recent years ownership structure has received more attention in corporate finance literature. Existing studies have emphasised the role of ownership – both the level and concentration in capital markets. The importance of studying the ownership level stems from its effect on determining the level of market liquidity (Chiang & Venkatesh 1988). In this study, ownership level refers to insider and institutional ownership since these variables are the most debated in ownership-liquidity studies (Rubin 2007; Zhou 2011). For example, several studies document that insider ownership affects market liquidity. Both Comerton-Forde & Rydge (2006) and Rubin (2007) argue that insider ownership has a negative impact on market liquidity. The authors explain that higher insider ownership increases the probability that the insiders may trade on their private information. However, other studies indicate that the effect of insider ownership on market liquidity is still mixed and inconclusive (Heflin & Shaw 2000; Zhou 2011).

Institutional shareholders tend to hold large amounts of stock for trading purposes. They trade more frequently than other investors, which may increase market liquidity (Gompers & Metrick 2001; Hamilton 1978; Poon et al., 2013; Schwartz & Shapiro 1992; Tinic 1972). Nevertheless, in terms of the role of institutional ownership on market liquidity existing literature has reported mixed results. For example, Chiang & Venkatesh (1988) and Kini & Mian (1995) conclude that there is no relationship between institutional ownership and bid-ask spread. However, Fehle (2004) reports

that institutional ownership lowers bid-ask spread, which is inconsistent with the notion that institutional owners are informed investors about the firm's private information. In contrast, Sarin et al. (2000) and Dennis & Weston (2001) find a positive relationship between institutional ownership and bid-ask spread. However, Sarin et al. (2000) state that the positive relationship between institutional ownership and bid-ask spread is due to their positive effect on trading activity. In contrast, Dennis & Weston (2001) conclude that the positive effect on bid-ask spread is because of the adverse selection effect of institutional ownership.

In addition to ownership level, another strand of literature suggests that ownership concentration may affect market liquidity. Specifically, Bhide (1993) presents a theory based on the view that large shareholders who reduce agency costs by providing internal monitoring also reduce market liquidity by creating an information asymmetry in the capital market. However, extant empirical studies have reported mixed results about the effect of ownership concentration on market liquidity. For instance, Heflin & Shaw (2000) find a positive impact of blockholders on bid-ask spread after controlling for the real friction of market liquidity (i.e. number of trades and trade size), which supports the notion that blockholders have access to private and value-relevant information. In the same spirit, Jacoby & Zheng (2010) reveal that blockholders have a positive impact on bid-ask spread. In contrast, Brockman et al. (2009) show that blockholders have no impact on bid-ask spread after controlling for the real friction (i.e., trading activity measures) of market liquidity. They imply that blockholders have no impact on information friction of market liquidity.

Based on the above discussion, this study has the following objectives. First, this study investigates the impact of ownership level and concentration on market liquidity in the UK public firms. More specifically, this study examines the effect of insider, institutional and ownership concentration; blockholders and largest shareholders on stock market liquidity. This is mainly based on the argument that until now only a limited numbers of studies in the UK have addressed the ownership-liquidity relationship. In addition, most of the findings from the published literature are mixed and inconclusive. As a result, this study provides empirical evidence on the ownership-liquidity relationship by using a sample of UK listed companies.

Second, this study aims to investigate the effect of owners' identity on market liquidity in the UK. In particular, it seeks to identify whether institutional and non-institutional owners determine market liquidity. It also tests whether the executive and non-executive directors' ownership has an effect on market liquidity or not. The "*information hierarchy hypothesis*" postulates that those

directors who are more familiar with the day-to-day operations of the company trade on the basis of more valuable information (Seyhun 1986). Moreover, Jeng et al. (1999, p. 32) argue that, "*some insiders are more insider than others*". Third, this study seeks to provide evidence from the recent financial crisis by investigating the relationship between ownership level, concentration, owners' identity and market liquidity during the crisis. To do so, this study creates three sub-samples: pre-crisis, crisis and post-crisis periods, to highlight the effect of ownership level, concentration and owners' identity on market liquidity in these three periods on UK firms.

In order to meet these objectives, this study will try to answer the following research questions:

1. Does the ownership level and concentration determine the market liquidity in UK firms?
2. Does owners' identity have an effect on market liquidity in UK firms?
   2.1. Does the institutional blockholders' identity affect market liquidity?
   2.2 Does the non-institutional blockholders' identity affect market liquidity?
   2.3. Does the insiders' identity affect market liquidity?
3. Did ownership level, concentration and owners' identity determine market liquidity of UK firms during the recent financial crisis?

1.4 Contributions of the Study

This study is one of very few studies that examine the effect of ownership structure on market liquidity in the UK. As discussed above in the motivation section, there is a clear difference in ownership structure between the UK and US. By recognising this gap in the literature, this study aims to fill it and open a new line of research that could enhance our understanding of the relationship between ownership level, concentration, owners' identity and market liquidity empirically in the UK. Therefore, this study contributes to the ownership structure studies by assessing the relationship between ownership level in terms of insider and institutional and market liquidity in the UK.

Moreover, ownership concentration is included in this study besides ownership level. This study, therefore, contributes to the ownership structure literature by investigating the effect of ownership level and concentration on market liquidity in the UK. More importantly, to the best of the author's knowledge, this study is the first of its kind that investigates whether ownership structure is a determinant of market liquidity in the UK or not. We argue that due to the importance and role of the UK stock market in the global economy and the limited number of studies in this area of

research, this study would add further insights to the existing literature. Keeping this in mind, an examination of the ownership structure and liquidity relationship in the UK market provides a motivation to conduct this study.

Further, this study contributes to the existing literature on ownership structure in determining market liquidity by exploring the effect of owners' identity on market liquidity in the UK. More specifically, the role of insiders' identity in understanding whether market liquidity would differ if the owners were executive and non-executive directors of companies. This is particularly important due to the recent increase in the number of non-executive directors in UK companies (Mura 2007). For example, in the UK, the insider definition is narrower, including the members of the board of directors (both executives and non-executives), but excluding other key employees and large shareholders. However, US insiders are defined as officers, directors, other key employees and shareholders with more than 10% of any equity class (Lakonishok & Lee 2001). Thus, this study contributes to the ownership structure literature by investigating the effect of insider ownership composition on market liquidity. In addition, this study contributes to the ownership structure literature by providing evidence on how ownership level, concentration and owners' identity is related to market liquidity during the recent financial crisis, 2007-2009. The study examines this relationship for the UK firms in three sub-periods. These periods are pre-crisis period (2004-2006), crisis period (2007-2009) and post-crisis period (2010-2012).

Furthermore, some of the published literature in this area indicates that the ownership variables are endogenously determined (Fehle 2004; Heflin & Shaw 2000; Naes 2004; Rubin 2007). In the existing literature, the most common technique used to control for endogeneity is to use the lagged values of ownership structure variables (Brockman et al., 2009; Heflin & Shaw 2000). Moreover, other studies recommend the use of instrumental variables method for this purpose (Rubin 2007). However, there is no agreed number of instrumental variables to control for the endogeneity problem (Naes 2004; Rubin 2007). Furthermore, other traditional methods like ordinary least squares and fixed or random effects models, used by most ownership structure related studies, have provided biased and inconsistent results. For instance, while these methods may be able to control for the unobserved heterogeneity; they fail to control for tackling the problem of simultaneity.

As a consequence, this study first employed two methods of estimations, fixed effects models and random effects models of estimation in examining the relationship between ownership level, concentration, owners' identity and market liquidity. However, the result of Hausman (1978) model

specification tests show, the fixed effects models as the appropriate technique for examining the the relationship between ownership level, concentration, owners' identity and market liquidity.[3] In addition, as highlighted by Poon et al. (2013), most of the previously published studies in this area failed to control for two types of endogeneity, namely, unobserved heterogeneity and simultaneity. This study therefore, uses three different steps for minimising the effect of endogenenity in the estimations. First, this study follows Brockman et al. (2009) for controlling the effects of simultaneity by using "lagged values" of the ownership variables. Second, in order to control for unobservable heterogeneity, this study follows Poon et al. (2013) and includes year and industry dummies in all the model specifications. Third, this study estimates robust standard errors to control for serial correlation and heteroskedasticity using the option "Robust" in STATA 11. In light of this, I would argue that the choice of estimation method and controlling the problem of endogeneity are the two most important elements in this examination, which has helped in the provision of robust and consistent conclusions.

1.5 Structure of the Thesis

This chapter has provided an overview about the background and rationale of the study. The study motivation, objectives and contributions have also been highlighted. ***Chapter 2*** provides a review of the theoretical and empirical literature on the relationship between ownership level, concentration and owners' identity, and market liquidity. The chapter begins with a detailed review of the agency theory, and then discusses the adverse selection and trading hypotheses as the two main hypotheses in the ownership-liquidity relationship. The review then evaluates findings of existing empirical literature in this area and generates research gaps. The last part of this chapter discusses those empirical papers in this area which covers the effect of financial crisis on the ownership structure - liquidity relationship.

Chapter 3 provides details of the methodological framework employed in this research. This chapter presents details of the data collection process and sample selection criteria. The chapter also contains information about the empirical models employed in this research and explains the definitions and measurements of the study variables. In addition, there are also discussions about potential econometric issues raised by previous studies in this area and the measures this study took in tackling those issues. In addition, this chapter presents an overview of the application of pooled

[3] The Hausman (1978) test results for examining the effect of ownership level and concentration on market liquidity and the effect of owners' identity on market liquidity, are respectively as follows; prob>chi2= 0.8587 and prob>chi2= 0.7458. As a result, this study employs fixed effect models over and above the random effects models of estimation.

OLS year and industry dummies as the main estimation method and provides justification for the selection of this method.

Chapter 4 presents empirical evidence on the relationship between ownership level, concentration and market liquidity in the UK. The chapter first presents details of the research hypotheses and then explains the empirical analysis obtained through the application and use of pooled OLS year and industry dummies as the main estimation method of this investigation. The empirical findings presented in this chapter indicate that ownership level and concentration affect market liquidity in the UK. Moreover, further analysis and robustness tests are also included in this chapter.

Chapter 5 discusses the empirical findings on the relationship between owners' identity and market liquidity. The chapter begins with the hypothesis development. It then moves to discuss the empirical analysis and results obtained through the application of pooled OLS year and industry dummies as the estimation method used in this chapter. The empirical findings indicate that owners' identity has different impacts on market liquidity in the UK. In addition, further analysis and robustness tests are also included in this chapter.

Chapter 6 examines the impact of ownership level, concentration and owners' identity on market liquidity during the recent 2007-2009, financial crisis. This chapter's analyses are divided into three different sub-periods, i.e. pre-crisis, crisis and post-crisis periods. This helped the author in differentiating the effects of the recent financial crisis in different periods. The main estimation method employed in this chapter is again the pooled OLS year and industry dummies' approach. Furthermore, the chapter evaluates the findings and provide discussions about the effects of the crisis over the three different periods. Finally, ***Chapter 7*** provides a short summary of the overall contents and empirical findings of the study and concludes the thesis. In addition, this chapter provides details of the study contributions and implications, limitations and also specify avenues and recommendations for future research.

1.6 Summary

This chapter has explained the underlying motivations for pursuing the study, and discussed its objectives. The chapter has also explained the potential contributions of the study's findings, and it provides an overview of the content of the whole thesis; it is expected, that the brief overview of all the chapters will make it easier for the reader to locate any particular areas of interest. The next chapter presents a brief overview of existing literature in this area of research. The chapter provides an assessment of relevant theories and empirical literature, and also identify gaps in the subject area.

Chapter 2

Literature Review

2.1 Introduction

Over the last two decades, the relationship between ownership structure and market liquidity has stimulated the interests of many academics, regulators and researchers. The root of this relationship can be attributed to the separation of ownership and control, and diffused versus concentrated ownership (Berle & Means 1932; Maug 1998). Nevertheless, the existing literature has suggested investigating the above-mentioned relationship from two perspectives (Rubin 2007). The first one is the adverse selection perspective, which states that when informed shareholders possess superior information about the firm's prospects compared to other shareholders, an information asymmetry arises, which decreases market liquidity (Easley & O'Hara 1987; Glosten & Milgrom 1985; Grossman & Stiglitz 1980; Kyle 1985). The second one is the trading perspective, which documents that when investors turn over their portfolio more frequently, transactions costs are reduced, which increases market liquidity (Demsetz 1968; Merton 1987; Schwartz & Shapiro 1992). As a result, studying the relationship between market liquidity and ownership structure is ambiguous.

This chapter starts with a review of agency theory, which provides the theoretical background for explaining the nature and context of the principal-agent relationship (Jensen & Meckling 1976). Thus, understanding agency theory is the first step in knowing about ownership variables such as how blockholders and large shareholders can affect market liquidity through the liquidity-control trade-off. The chapter then moves to focus on the adverse selection and the trading hypotheses. After providing the theoretical explanations for the above-mentioned theories and hypotheses, the empirical work on the ownership level and concentration and market liquidity is also reviewed and discussed.

The second part of this chapter focuses on the role of owners' identity on market liquidity. In this regard, the existing literature indicates that the identity of different owners has different impacts on market liquidity (Fehle 2004; Poon et al., 2013). Keeping this in mind, this chapter presents a review of both the theoretical and empirical literature on the relationship between owners' identity

and market liquidity. Furthermore, the last part of this chapter reviews the effect of ownership level, concentration and owners' identity on market liquidity during the recent financial crisis.

The rest of this chapter is organised as follows: Section 2.2 reviews the agency theory, the sources of conflict in the agency relationship and their relevance to market liquidity. Section 2.3 discusses the ownership structure - liquidity approaches. Section 2.4 covers details of the empirical work on the relationship between ownership level, concentration and market liquidity. Section 2.5 presents the ownership structure trends in the UK. Section 2.6 presents an overview of the theoretical and empirical literature on the relationship between owners' identity and market liquidity. Section 2.7 presents the relationship between ownership level, concentration, owners' identity and market liquidity during the recent financial crisis. The final section concludes this chapter by providing a short summary of the contents and generates links with the next chapter.

2.2. Agency Theory

The origin of conflicts, which emerge from the separation of ownership and control, was first explained in the seminal work of Berle & Means (1932). According to Berle & Means (1932), when a firm begin its operation it is small in size and where owners are also act as managers of the firm. However, the case is different when the firm grows larger in size because more capital is needed for financing its operations. The firm would therefore, seek external capital from the market due to which, other investors also provide funds and share the ownership with the existing owners. At this point due to disperse ownership managers are appointed for controlling the firm's operations. Consequently, the division of labour is now clear; the firm's managers have the needed skills and knowledge to run the firm more effectively. The relationship between dispersed owners and manager was described as the agency relationship by Ross (1973) and Jensen & Meckling (1976), which provide a detailed explanation of the principal-agent relationship explained under the agency theory framework.

Jensen & Meckling (1976, p. 5) define the agency theory relationship as " *a contract under which one or more persons- the principal- engage another person- the agent – to perform some services on their behalf which involves delegating some decision making authority to the agent*". In other words, agency theory is the divergence of interest between shareholders and managers (Eisenhardt 1989). In particular, the agents may take decisions that serve their own interests. Nevertheless, Shleifer & Vishny (1997, p. 741) provide another definition for the agency problem: "*the*

difficulties faced by financiers in assuring that their funds are not expropriated or wasted on unattractive projects". Thus, agency theory assumes that managers deviate from shareholders' wealth maximisation and serve their own personal interests (Jensen & Meckling 1976). As a result, the agency theory framework has been applied and expanded by researchers in different contexts all over the world.

While discussing concentrated ownership in firms, Holderness (2009) explains that the shared benefits of control and the private benefit of control as two main reasons, which may encourage shareholders to concentrate their ownership in the firm. In this regard, Shleifer & Vishny (1997) argue that large blockholders would seek to maximise their wealth because they have the power and ability to control the management to some extent. Furthermore, existing corporate governance literature has also indicated the benefits of large blockholders by considering these as a source of power in firms. For instance, Hoskisson et al. (2002) state that a large shareholder is considered to be an effective monitoring tool for managerial actions and decisions.

However, despite the clear advantage of large blockholders, their existence in a firm carries a cost as well. Large blockholders may be motivated to expropriate the firm's resources or have some special benefits that are not available to the minority shareholders (Holderness 2009). The main problem is that, while large investors use their voting power to serve their own benefit, this is not necessarily matched with other investors' interests in the firm, or that of employees or even the managers (Shleifer & Vishny 1997). Further, Shleifer & Vishny (1997 p. 758) state that " *the process of using his control rights to maximize his own welfare, the large investors can therefore redistribute wealth – in both efficient and inefficient ways – from others*". Therefore, two types of agency conflicts have been explained in the corporate governance literature. The first one is the classic owner-manager conflict described by Berle & Means (1932) and Jensen & Meckling (1976), which Villalonga & Amit (2006) refer to as *type 1 agency conflict.* Within this context, monitoring can be effective only if a single party becomes large enough to internalise the cost of control (Grossman & Hart 1980). In contrast, large shareholders may expropriate wealth from minority investors (Shleifer & Vishny 1997). Consequently, the second type of agency problem emerges between large and minority shareholders, which has been regarded as *type 2 agency theory conflict* (Villalonga & Amit 2006). However, large shareholders may monitor the mangers' behaviours due to their position as the controlling shareholders, and moderate their influence and power (Pagano & Roell 1998). Still, due to their potential, their presence in a firm may add professionalism and

experience to firms and contribute to better decision-making (Bolton & Von Thadden 1998; Lehmann & Weig 2000; Winton 1993).

In line with the above, one of the causes of agency problem is the shareholders' diffuse ownership, which makes shareholders less motivated to monitor mangers, which leads managers to engage in self-interested decisions (Jensen & Meckling 1976). In contrast, a vast body of literature has considered the ownership concentration as a tool that may reduce the principal-agent conflict (Shleifer & Vishny 1997). According to agency theory, investors with concentrated ownership are highly motivated to monitor the management of firms (Shleifer & Vishny 1997). Nevertheless, the concentration of ownership may create another conflict, which is known as the principal-principal (P-P) agency problem (Globerman et al., 2011; Wu et al., 2011).

Young et al. (2008) state that the principal-principal (P-P) conflict mainly occurs between the controlling and minority shareholders of the firm due to two different reasons. First, due to the existence of shareholders with concentrated ownership this would negatively affect the rights of minority shareholders. Second, the existence of weak corporate governance mechanisms as well as a legal system cannot effectively protect minority shareholders' rights. Consequently, the P-P agency problems typically exist between the firm's majority and minority shareholders. In general, majority shareholders own substantial equity ownership in the firm and would therefore manage access to more private information (Shleifer & Vishny 1997).

Nevertheless, acquiring a controlling position can be prohibitively costly for large shareholders due to their preferences for diversification and liquidity of their portfolios (Admati et al., 1994; Bhide 1993; Parrino et al., 2003). In this regard, some studies argue that monitoring gains can still be achieved through ownership changes in public transactions (Admati et al., 1994). In particular, in circumstances when trading is conducted under information asymmetries (Khan & Winton 1998; Maug 1998). The ability of shareholders monitoring for capturing gains is likely to depend on factors such as, available monitoring technologies and diversification concerns (Admati et al., 1994), trading liquidity (Maug 1998), and firm transparency (Khan et al., 2005). This study therefore explains the effect of ownership structure on market liquidity in the context of P-P agency relationship highlighted in some recently published studies in this area (see for example, Young et al., 2008; Globerman et al., 2011; Wu et al., 2011). Furthermore, the corporate governance

literature indicates some causes for the conflicts in the agency relationship such as moral hazard and the adverse selection problem explained below.

Moral Hazard and Adverse Selection

Another source of conflict is known as moral hazard, which refers to the possibility of the agent being less responsible and not exerting the maximum effort (Alchian & Demsetz 1972). For instance, Eisenhardt (1989, p. 61) defines ***moral hazards*** as "*lack of effort on the part of the agent"*. In other words, moral hazards exist because the principal cannot observe the managerial action all the time and, consequently, cannot judge the quality of the management team (Eisenhardt 1989). In the light of incomplete contracts and moral hazards, it is difficult for shareholders to control such conflicts in the principal-agent relationship. According to Denis (2001), the shareholders fail to conduct effective monitoring because they lack the proper experiences, which means that they may not understand the managerial actions. In addition, they lack incentives to perform this monitoring, especially when they own only a small equity in the firm and the monitoring cost may outweigh the benefit.

Agency theory assumes that a firm's mangers, who run the daily affairs of the business, have more information than its shareholders (Fama & Jensen 1983). This leads to an information asymmetry, which is considered a source of conflict in the agency relationship. The existence of information asymmetry limits the shareholders' ability to properly monitor managerial actions and make sure that those mangers are working in the shareholders' interests (Adams 1994). Furthermore, the inability of shareholders to access all the information and therefore judge the managerial decisions creates another problem, so-called ***adverse selection***.

According to Eisenhardt (1989, p. 61), "*adverse selection refers to the misrepresentation of ability by the agent. The argument here is that the agent may claim to have certain skills or abilities when he or she is hired. Moreover, the adverse selection arises because the principal cannot completely verify these skills or abilities either at the time of hiring or while the agent is working*". Consequently, the existing literature suggests several actions to mitigate the information asymmetry effect (Watts & Zimmerman 1983, 1986). These studies state that the disclosure and financial reporting of private information forces mangers to disclose certain information to shareholders. Moreover, they emphasise the need for information intermediaries such as financial analysts who

may reduce information asymmetry through facilitating disclosure between a firm's managers and shareholders.

From a ***market liquidity perspective***, a vast body of literature has examined the issue of monitoring incentives of firms with market liquidity. An influential view generally attributed to Hirschman (1970), states that when monitors can easily 'exit' the firm they tend not to exercise their 'voice'. In other words, blockholders cannot be relied upon to monitor management actively if they have the option to sell their stake instead (Black 1990). Moreover, existing literature has argued that it is precisely the highly liquid nature of US markets that makes it difficult to provide incentives to large shareholders to monitor management. This issue has been analysed by Khan & Winton (1998) and Maug (1998), among others. For example, Khan & Winton (1998) show how market liquidity can determine large shareholders' incentives to monitor by giving them incentives to trade on private information rather than exercising their vote. They argue, however, that incentives to speculate may be small for blue chip companies, where a large shareholder is unlikely to have a significant informational advantage over other market participants. In the same spirit, Maug (1998) points out that in liquid markets it is also easier to build a block. This gives large shareholders an added incentive to invest in information gathering and gain against uninformed investors.

Another perspective is that large shareholders may want to limit their stake to ensure minimum market liquidity. In this regard, Holmstrom & Tirole (1993) argue that share prices in the secondary market provide valuable information about a firm's performance. To obtain accurate valuations, however, the secondary market must be liquid. Indeed, liquidity raises the speculator's return for acquiring information and thus improves the informativeness of the secondary market price. The more informative stock price can then be included in compensation packages to provide better incentives to mangers. According to this view, it is the market that does the monitoring exercise, and it may only be necessary for the large shareholders to act on the information produced by the market (Barlett 1994; Gomper & Lerner 1999; Levin 1995).

In other words, there may be a natural complementarily between speculators in market liquidity and monitoring by large shareholders. This idea is pursued further in Faure-Grimaud & Gromb (1999) and Aghion et al. (2000). These models show how large shareholders' monitoring costs can be reduced through better pricing of shares in the market liquidity. The basic idea is that more accurate

pricing provides not only greater liquidity to the large shareholders, but also enhances their incentives to monitor by reflecting the benefit of their monitoring activities in the stock price.

Outcome of the above discussions suggest, that market liquidity could also affect ownership structure in reverse order. In other words, the market liquidity may affect the monitoring incentives of large shareholders and blockholders (Holmstrom & Tirole 1993; Maug 1998). Nevertheless, taking into consideration that this study examines the effect of ownership structure on market liquidity, the following section explains the theoretical framework of the ownership-liquidity relationship. In this regard, existing literature that examines the relationship between ownership structures and market liquidity specify two main approaches. The first approach covers the liquidity-control trade-off approach to market liquidity, whereas, the second approach link the market microstructure to market liquidity (Ginglinger & Hamon 2007; Rubin 2007). The next section thus explains these two approaches.

2.3 Ownership Structure- Liquidity Approaches

The Liquidity-Control Trade-off Approach to Market Liquidity

A vast body of literature has documented that large shareholders face a free-rider problem because they bear the costs of monitoring alone, whereas all the small shareholders benefit from their monitoring efforts. The impact of free riding depends mainly on the stake of shares, which has two effects. On the one hand, ***the lock-in effect***: owning a larger share makes the return on the company's shares more significant for the large shareholder. As a result, it stimulates them to engage more in the monitoring process. On the other hand, ***the liquidity effect****:* this postulates that, if a large shareholder owns a significant fraction of the total shares, this makes the market less liquid, which reduces the large shareholder's expected gains from trading on private information.

Large shareholders make a direct profit through trading at the expense of uninformed liquidity traders (i.e. individuals); this conjecture is built from the fact that large shareholders have decided to monitor a company that provides them with private information relative to the outside market participants. Moreover, large shareholders also make a profit on their initial stake because shares initially trade below their intrinsic value; on the other hand, individual investors are only willing to hold shares at an adverse selection discount that reflects the expected loss from trading with informed investors in the future.

The theoretical work on the relationship between ownership structure and market liquidity refers back to the seminal work of Coffee (1991), who states that there is a trade-off between liquidity and control. In other words, the concentrated ownership that is needed for efficient control as an internal corporate governance mechanism may reduce the market liquidity. Moreover, Holmstrom & Tirole (1993, p. 696) document that "*an insider who holds some fraction of the firm as a long term investment, if he decides to decrease his ownership, there will be more shares actively traded and the liquidity of the market will go up*". Overall, concentrated ownership increases the extent to which stock market participants monitor the firm, and decreases the amount of information available about the firm, which leads to lower market liquidity.

In the same spirit, Bhide (1993) mentions that active stockholders who reduce agency costs by providing internal monitoring also reduce market liquidity by creating information asymmetry problems. This is particularly true for firms with higher ownership concentration where all investors play an active role in the internal corporate governance mechanisms; their stock, however, cannot be readily traded in the capital market. As a result, market liquidity is decreased because the number of shareholders available to trade is smaller. Furthermore, existing literature has documented that, if a firm has a dispersed ownership of shares, there are more shareholders to trade with, but the probability of efficient corporate control is weaker (Bolton & von Thadden 1998a, b; Maug 1998). For example, Bolton & Von Thadden (1998 a, b) examine the relationship between ownership dispersion and market liquidity. They state that, in countries with dispersed ownership, capital markets are usually liquid, such as the US and UK capital markets. The opposite holds for countries with more concentrated ownership and a control-oriented corporate governance regime, like Germany's capital market.

In particular, Bhide (1993, p. 45) mentions that '*If the proportion of firm's equity held by diffuse investors is subsequently increased; liquidity increases because larger number of stockholders will participate in the trade*', providing further support in the US for this perspective. Similarly, Holmstrom & Tirole (1993) and Bhushan (1989) state that, with more liquidity traders, it becomes easier for an informed party (a speculator) to distinguish his private information and make money on it. In addition, as reported by Kothare (1997), market liquidity increases when ownership becomes more diffuse and decreases when ownership becomes more concentrated. In the UK, Maug (1998), argues that a higher degree of market liquidity in the market makes it more attractive for large shareholders to sell their shares rather than to stay and monitor. He suggests that, while

liquid markets reduce large shareholders' incentive to monitor because they can sell their holdings easily, such markets make corporate governance more effective as it is cheaper and easier to acquire and hold large stakes. Thus, higher market liquidity may reduce monitoring by large shareholders (Khan & Winton 1998). To the best of the author's knowledge, the there is abundance of research contributions on the role of liquidity in spurring monitoring. In contrast, few studies have investigated the effect of ownership structure on market liquidity. Furthermore, prior studies have also suggested that the effect of ownership structure on market liquidity can be better explained from a market microstructure perspective. Consequently, the next section discusses the ownership-liquidity relationship from a market microstructure perspective.

The Market Microstructure Approach to Market Liquidity

Bagehot (1971) first examined the relationship between ownership structure and market liquidity. He classifies traders into liquidity traders (uninformed traders) and informed traders, with the latter possessing private information about the firm's prospects. However, liquidity traders do not have the ability to access private information, unlike informed traders. In line with this, Chiang & Venkatesh (1988) state that ownership structure can affect market liquidity from a market microstructure perspective. On the one hand, some studies regard uninformed traders as "***noise traders***", who trade for rebalancing motives or simply because they believe they have information (see for example, Admati & Pfleiderer 1988; Copeland & Galai 1983). On the other hand, there are other studies which argue that informed traders have private information about the firm's prospects and they trade upon it (see for example, Glosten & Milgrom 1985; Kyle 1985). Similarly, evidence in the existing literature suggest also show how trading by informed investors creates information asymmetry in the capital markets and the way market makers recapture their losses suffered in trading with informed investors (Admati & Pfleiderer 1988; Copeland & Galai 1983; Easley & O'Hara 1987; Glosten & Milgrom 1985; Kyle 1985). For instance, Kyle (1985) shows that the larger the number of uninformed investors, "***liquidity traders***", the lower is the bid-ask spread. In contrast, in a market where transactions are more likely to be initiated by informed traders, the bid-ask spread is larger, and the price impact ratio is stronger, which decreases liquidity in the market.

In the same spirit, Admati & Pfleiderer (1988) state that there are two motives for trading in the financial market, which are information and liquidity, which gives more emphasis to the idea that there are two types of trader, informed and uninformed. Figure 2.1 in this study shows the motives of investors and traders according to the theoretical relationship between ownership structure and

market liquidity from the market microstructure perspective. Two streams of literature have emerged to investigate the above-mentioned relationship. On the one hand, some studies have used high-frequency data to study the ownership-liquidity relation such as the insider trading and the adverse selection component of bid-ask spread (Admati & Pfleiderer 1988; Copeland & Galai 1983; Easley & O'Hara 1987; Glosten & Milgrom 1985; Jaffe 1974; Kyle 1985). These studies assume that insider and institutional investors are better informed about the firm's private information than uninformed individual investors. In particular, insiders are actively involved in managing and overseeing the firm; thus, it is natural to expect that they would have access to information that others would not have.

In contrast, institutional investors do not have the ability to access the private information about the firm's prospects, unlike insiders, but still they can create an information asymmetry between the firm and market by exploiting economies of scale information acquisition and processing. Since their marginal costs of gathering and processing information are lower than for individuals, this may reduce the information asymmetry for firms with a large percentage of institutional investors. On the other hand, prior studies have used ownership structure as a proxy of the information asymmetry between the firm and market (Chiang & Venkatesh 1988). They examined market assessment of the institutional and insider holding through their effect on the bid-ask spread. Chiang & Venkatesh (1988) report that there is a negative relation between bid-ask spread and insider holding, whereas there is no effect between institutional holding and bid-ask spread. Their results are in line with the work of Demsetz (1986), who notes that institutional owners differ from corporate insiders in that they do not specialise their portfolios, and do not have direct access to non-public information. These differences may reflect the legal and fiduciary constraints facing institutional investors.

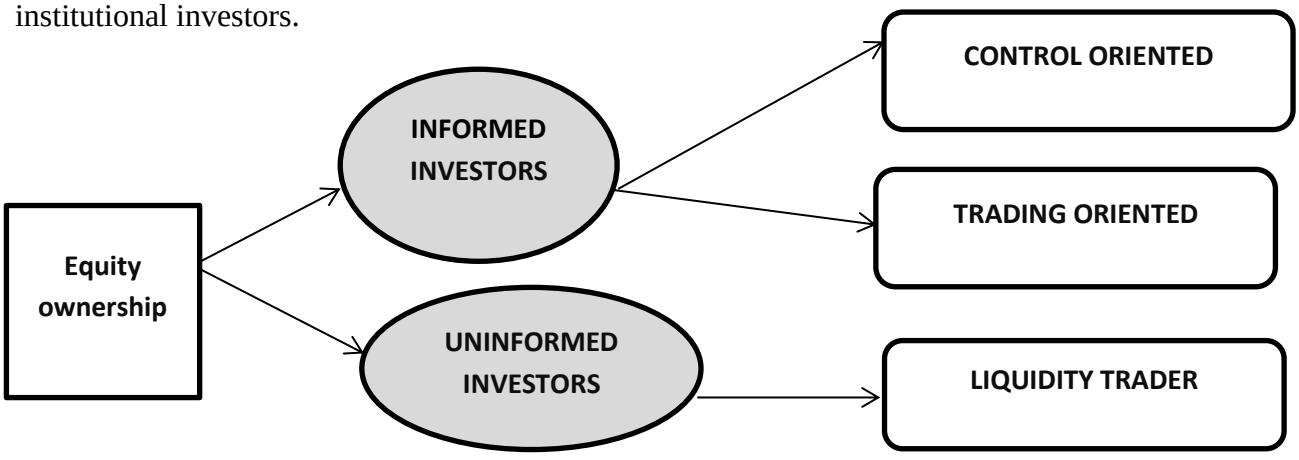

Figure 2.1 Informed versus Uninformed Investors' Motivations

2.4 Survey of the Empirical Studies

The previous discussion indicates that there are two approaches in order to examine the relationship between ownership structures and market liquidity, liquidity-control trade-off and market microstructure. In particular, this study mainly investigates the relationship between ownership level, concentration and owners' identity on market liquidity. In the next section, this study will present the empirical studies that investigate the relationship between ownership level, concentration and market liquidity. Then, the study will discuss the empirical studies that test the relationship between owners' identity and market liquidity.

2.4.1 The Impact of Ownership Level on Market Liquidity

Previous literature has intensively investigated the impact of ownership level on market liquidity. It has mainly focused on examining the effect of insider and institutional ownership on market liquidity. This section conducts a review of the empirical studies on the relationship between insider, institutional ownership and market liquidity in order to identify the research gaps in the literature.

2.4.1.1 Insider Ownership

Capital market literature has predicted a negative relationship between market liquidity and insider ownership (Copeland & Galai 1983; Glosten & Milgrom 1985; Grossman & Stiglitz 1988; Seyhun 1986). These studies emphasise that one cause of illiquidity in the capital market is the higher insider ownership in a firm. For instance, Seyhun (1986) and Demsetz (1986) suggest that the level of insider ownership in a firm may influence market liquidity and that there is a positive relationship between insider trading and stock holding. In particular, the market maker would regard that all those firms, which have higher insider ownership to experience a higher probability of trading with informed investors. Furthermore, Demsetz & Lehn (1985) argue that the benefits of higher insider ownership are greater in firms where the profit potential of a manager's action is uncertain. As a result, there is a link between the level of information asymmetry and the uncertainty of the firm's value. Moreover, existing literature has suggested that there is a positive relationship between insider ownership and information asymmetry (Chiang & Venkatesh 1988; Copeland & Galai 1983; Sarin et al., 2000; Zhou 2011).

In order to investigate the relationship between insider ownership and market liquidity two strands of literature have emerged. The first strand of literature was emerged first in 1980s and mostly investigate the relationship between insider ownership and market liquidity by using the bid-ask spread as a sole measure of market liquidity (see for example, Chiang & Venkatesh 1988; Kini & Mian 1995). Similarly, other studies in this strand of literature cover the adverse selection hypothesis, and suggest that insiders have better ability to possess private information about the firm's future prospects than outside investors (Glosten & Milgrom 1985; Glosten & Harris 1988; Grossman & Stiglitz 1980; Kyle 1985). In particular, the adverse selection hypothesis assumes that, as the insider ownership increases, the information asymmetry between inside and outside investors will also increase which would lead to a decrease in market liquidity. Consequently, an increase in insider ownership has been regarded as an additional motivation for insiders to access more private information about the firm's prospects which would decrease market liquidity. By using 37 NYSE firms in 1973, Chiang & Venkatesh (1988) find a negative relationship between the market liquidity and the level of insider ownership. Specifically, their findings show there is a positive relationship between insider holding and quoted bid-ask spread. This suggests that a high level of insider shareholdings increases the information asymmetry between the inside and outside investors and decreases market liquidity.

Nevertheless, Kini & Mian (1995) examine the relation between bid-ask spread and ownership structure based on 1985 for 1063 NYSE firms. They document a negative and significant relationship between insider ownership and bid-ask spread and no relationship between insider trading and bid-ask spread. However, the empirical evidence regarding the relationship between insider ownership and market liquidity is inconsistent. Some studies have reported a positive relation between the two variables; others have found a negative relationship. This evidence has been supported by Sarin et al. (2000), who use a sample of 786 for AMEX and NYSE for the year 1985 and conclude that the relative and quoted bid-ask spread were found to be positively significantly associated with insider ownership, whereas, there is a negative relationship between insider ownership and quoted depth. They suggest that higher adverse selection costs in firms with higher factional insider ownership are consequences of the increased probability of insider trade.

Moreover, their result indicates that, after controlling for insider trading, they observe an insignificant relation between information asymmetry and insider ownership. This suggests that the higher level of information asymmetry in the firms with larger insider ownership is a result of higher probabilities of insider trading. Dennis & Weston (2001) provide further support in the US

for this perspective; they study the association between insider ownership and the quoted bid-ask spread for 5500 NYSE, AMEX, and NASDAQ firms and find that firms with higher proportions of insider ownership have a higher quoted bid-ask spread. However, they regard insiders as informed investors.

The second strand of literature that tests the relationship between market liquidity and insider ownership emerged in the late 2000s and states that this relationship is ambiguous and that previous studies in the first generation failed to take into account the multidimensional concept of market liquidity (Rubin 2007; Stoll 2000)[4]. The existing literature has suggested that insider ownership affects both the real and information friction of market liquidity (Comerton-Forde & Rydge 2006; Rubin 2007). These studies document that insiders are informed investors about the firm's private information but tend to turn over their portfolio less often than other investors do, which increases the bid-ask spread and leads to a decrease in market liquidity. Moreover, it has been documented that "*an insider who holds some fraction of the firm as a long term investment, if he decides to decrease his ownership, there will be more shares actively traded and the liquidity of the market will go up*" (see Holmstrom & Tirole 1993, p. 701). Therefore, insider ownership in this case is likely to have a negative impact on market liquidity.

For the US market, Rubin (2007) examines the effect of insider ownership on market liquidity using a sample of 1369 NYSE firms for the period 1993-2003. He documents a positive and significant relationship between insider ownership and quoted, effective and realised bid-ask spread and Amihud (2002) illiquidity ratio. In contrast, he concludes that there is a negative relationship between insider ownership and trading volume. In Australia, Comerton-Forde & Rydge (2006) investigate the effect of insider ownership on illiquidity. Using 667 ASE listed firms from 1998 to 2003, their findings show a statistically significant positive relationship between insider ownership and market liquidity between 0% to 5% insider holdings; then a more statistically significant and positive relationship between 5% to 10% insider holdings; and finally a statistically significant and negative impact at 10% and more insider holdings. In particular, they suggest that at a low level of insider ownership there is a positive and significant relation between insider ownership and market liquidity; this signals to the market that insiders are providing effective monitoring, which enhances the firm performance "***convergence of interest hypothesis***". In contrast, the "***entrenchment hypothesis***" begins to offset monitoring benefits at a level of 10% insider ownership and shows a

[4] Real friction is the trading activity measures of market liquidity such as number of trades and trade size. However, information friction is the proportion of market liquidity that measures the degree of adverse selection level.

negative and significant relationship between insider ownership and market liquidity. Further, Zhou (2011) examines the relationship between ownership structure and liquidity and trade informativeness, using a sample of NYSE firms for the period July to September 2000. He finds that there is a negative relationship between insider ownership and market liquidity. Zhou (2011) regard insider investors as informed investors about the firm's prospects and find a statistically positive relationship between insider ownership and quoted as well as effective bid-ask spread. Zhou (2011) also documents a positive and statistically significant relationship between insider ownership and trade informativeness.

From the above discussion, this study notices that there was a mixed result in the relationship between insider ownership and market liquidity. Existing literature has documented that one of the reasons that leads to this conflict in findings is the so-called endogeneity problem, which will be discussed in detail in Chapter 3. Many studies have used different techniques in order to resolve two types of endogeneity: unobserved heterogeneity and simultaneous equation. From the unobserved heterogeneity perspective, some studies have used different robustness tests to check if there is any unobserved heterogeneity problem (Comerton-Forde & Rydge 2006; Denis & Sarin 1999; Gompers & Metrick 2001; Heflin & Shaw 2000; Kini & Mian 1995; Sarin et al., 2000). Existing studies use different robustness checks to detect if there is an unobserved heterogeneity such as the firm size effect (Chiang & Venkatesh 1988; Kini & Mian 1995) and simultaneous equation (Comerton-Forde & Rydge 2006; Dennis & Weston 2001; Rubin 2007). Consequently, this study uses different techniques to take into account the endogeneity problem. Moreover, this study notices that most of the studies that have been conducted to test the relationship between insider ownership and market liquidity used data from the US market. To the best of the author's knowledge, no study examine the above- mentioned relationship in UK.

2.4.1.2 Institutional Ownership

The relationship between market liquidity and institutional ownership is ambiguous. Some studies consider institutional owners as informed investors and others regard them as uninformed investors. Therefore, the literature has attempted to examine theoretically and empirically the impact of institutional ownership on market liquidity, and has reported inconsistent conclusions. Theoretically, this relationship stems from both the adverse selection and trading hypotheses.

From the adverse selection perceptive, institutional investors are less informed about the firm's private information than insider investors (Brockman et al., 2009; Chiang & Venkatesh 1988; Kini & Mian 1995; Rubin 2007). Using 63 NYSE firms in 1973, Chiang & Venkatesh (1988) report that there is no relationship between institutional ownership and bid-ask spread, and they state that institutional investors are not informed traders. However, Kini & Mian (1995) document a significant and negative relationship between institutional ownership and bid-ask spread for 1063 NYSE listed firms for 1985. In contrast, Sarin et al. (2000) use a sample of 786 for AMEX and NYSE for the year 1985 and find a positive relation between institutional ownership and bid-ask spread and negative relationship between institutional ownership and quoted depth. Nevertheless, they document that the positive relation between institutional ownership and bid-ask spread is because of the active trading of institutional investors, rather than because of their adverse selection effect. In other words, Sarin et al. (2000) regard institutional investors as uninformed investors.

In the same spirit, Fehle (2004) examines the impact of institutional ownership on market liquidity, measured by quoted and effective bid-ask spread, in 10,107 NYSE listed firms, over the period from 1980 to 1996. He reports a negative relationship between institutional ownership, quoted and effective bid-ask spread and documents that institutional owners are uninformed investors. In contrast, Dennis & Weston (2001) investigate the impact of institutional ownership on bid-ask spread, adverse components of bid-ask spread and probability of informed trading in 5500 NYSE, AMEX, and NASDAQ firms, over the period from Q4 1997 to Q4 1998. They find a significantly positive relationship between institutional ownership and quoted as well as the adverse selection component of the bid-ask spread and suggest that as compared to other investors institutions are better informed.

However, another stream of existing studies has suggested that institutional ownership can affect market liquidity from a trading perspective. According to the trading hypothesis, institutional investors trade more frequently, which increases market liquidity (Gompers & Metrick 2001; Hamilton 1978; Schwartz & Shapiro 1992; Tinic 1972). Consequently, recent literature has suggested the use of different proxies of market liquidity in order to capture the multidimensional nature of market liquidity (Rubin 2007; Stoll 2000). Comerton-Forde & Rydge (2006) investigate the relationship between institutional ownership and illiquidity measured by Amihud (2002) price impact ratio and turnover ratio. They report that there is a positive relationship between institutional ownership and turnover ratio and negative relationship with price impact ratio. Moreover, in the US Rubin (2007) examines the effect of institutional ownership on market

liquidity using a sample of 1369 NYSE firms for the period 1993-2003. He documents that there is a positive relationship between institutional ownership and market liquidity, suggesting that institutional investors trade more than other investors (i.e. insiders) do. In particular, he concludes that institutional ownership is positively related to the trading volume and depth. In contrast, institutional ownership is negatively related to quoted and effective bid-ask spread and price impact ratio.

In line with other prior studies (Demsetz & Lehn 1985; Denis & Sarin 1999; Falenstein 1996; Helfin & Shaw 2000), Rubin (2007) applies the simultaneous equation estimation of the three-step least squares (3SLS); he finds that institutional ownership is affected by market liquidity. In particular, institutional ownership decreases with increases in quoted and effective bid-ask spread. Furthermore, he documents that institutions prefer large and liquid stocks. As a result, market liquidity and institutional ownership may be simultaneously determined; that is, an institutional investor's decision to become a shareholder or a blockholder may depend on the firm's market liquidity. Furthermore, Jennings et al. (2002) explore the relationship between institutional ownership and quoted bid-ask spread and the adverse selection component of bid-ask spread for NASDAQ firms 1Q 1983-3Q 1991. They report a negative relationship between institutional ownership and bid-ask spread. Furthermore, they investigate how the institutional identity affects bid-ask spread. Specifically, they find that independent advisors ownerships' have the strongest effect on the bid-ask spread. In contrast, investment companies ownerships' have little impact on the bid-ask spread.

Additionally, Jennings et al. (2002) employ Granger causality test in order to deal with the endogeneity problem; they document a negative relationship between institutional ownership and bid-ask spread. In particular, Granger causality test finds that changes in bid-ask spread cause changes in institutional ownership. Nevertheless, they find that increase in institutional ownership lead to a decrease in bid-ask spread. Furthermore, Jennings et al. (2002) show that changes in the institutional ownership causes a change in the informational environment surrounding the firms.

In contrast, Sarin et al. (2000) use a sample of 786 for AMEX and NYSE for the year 1985, and find that the relationship between institutional ownership and bid-ask spread (depth) is positive (negative); however, they report that there is no relationship between institutional ownership and adverse selection costs. Moreover, they document that there is a positive relationship between the average trade size and institutional ownership. They use ordinary least square (OLS) as the main

method of estimation. As a further check, they use simultaneous equations; they report that there is a negative relationship between bid-ask spread and institutional ownership and a positive relationship between institutional ownership and trading volume. In a further US study by Zhou (2011), tests the relationship between ownership structure, market liquidity and trade informativeness. By using a sample of firms from the New York Stock Exchange over the period between July and September 2000, he reported a positive relationship between institutional ownership and market liquidity. He also documents a positive relationship between institutional ownership and informativeness of trades and argues that institutional investors are better informed about the firm's private information regarding the firm's prospects.

A further stream of literature has emerged to resolve the endogeneity problem (Barabanov & McNamara 2002; Dennis & Weston 2001; Fehle 2004; Rubin 2007; Sarin et al., 2000). Each of these studies takes a slightly different approach in dealing with the endogeneity problem that is potentially latent in cross-sectional regression. For example, some studies have used panel data (Fehle 2004), simultaneous equation (Rubin 2007; Sarin et al., 2000), and simultaneous equation and 2SLS (Barabanov & McNamara 2002). Recently, Poon et al. (2013) used Pooled OLS year and industry dummies to alleviate concerns about endogeneity and spurious inferences. They include industry fixed effects to control for time-invariant omitted industry-level factors that affect liquidity. Moreover, they also include year effects to control for cross-sectional dependence; that is, market-wide factors that affect market liquidity. Furthermore, Poon et al. (2013) cluster the errors at the firm level in order to control for time-series dependence.

2.4.2 The Impact of Ownership Concentration on Market Liquidity

The literature has intensively investigated the impact of ownership concentration on market liquidity. It has mainly focused on examining the effect of blockholders on market liquidity. This section conducts a review of the empirical studies on the relationship between ownership concentration and market liquidity.

2.4.2.1 Ownership Concentration

The existing literature has stated that blockholders possess economies of scale in the collection of information or might have access to private and value-relevant information (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010). Thus, there is a strong belief, backed by the

theoretical models of Copeland & Galai (1983) and Glosten & Milgrom (1985), which suggest that market participants face an adverse selection problem from these informed investors. As a result, market makers increase the bid-ask spread, which leads to lower market liquidity. Nevertheless, the empirical studies that have examined the impact of blockholders on market liquidity have been inconsistent (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010). In the US, Kini & Mian (1995) document a significant and positive relationship between blockholders and bid-ask spread for 1063 NYSE listed firms for 1985. Moreover, Heflin & Shaw (2000) investigate the impact of blockholders on market liquidity, measured by quoted, effective, adverse selection components of bid-ask spread and depth, in 260 US listed firms, over the period from 1988 to 1989. They report a positive relationship between blockholders and, the quoted and effective bid-ask spread, and adverse selection spread components. However, they report a negative relationship between blockholders and quoted depth.

Nevertheless, Rubin (2007) examines the effect of blockholders on market liquidity using a sample of 1369 NYSE firms for the period 1993-2003. He documents a negative relationship between blockholders and dollar volume and a positive relationship between bid-ask spread and price impact ratio. Thus, it appears that blockholdings improve market liquidity. Furthermore, Brockman et al. (2009) examine the relationship between blockholders and market liquidity measured by real, information and total cost of market liquidity for 1225 NYSE and AMEX companies over the period from 2000 to 2006. They conclude that blockholders affect market liquidity through their adverse impact on real friction of market liquidity (i.e. trade size and number of trade). After controlling for this real friction effect, the relationship between bid-ask spread and blockholders is insignificantly negative. They suggest that blockholders are uninformed investors, which explains the negative relationship between market liquidity and blockholders. Moreover, they report a negative relationship between blockholders and turnover ratio and number of trades. However, they show that the relation between blockholders and average trade size is insignificant, suggesting that blockholders as a whole neither increase nor reduce average trade size.

However, Brockman et al. (2009) focus only on NYSE and AMEX firms; as a result, Jacoby & Zheng (2010) test the relationship between blockholders and market liquidity and use 1071 NYSE, 323 AMEX and 2182 NASDAQ firms for the year 1995. They use two dimensions of ownership concentration: number of shareholders and blockholders. They measure market liquidity by bid-ask spread, probability of informed trading (PIN), depth, and trading volume. For NYSE/AMEX, they report a positive relationship between blockholders and bid-ask spread and PIN, while there is a

negative relation between blockholders and quoted depth and dollar trading volume. With respect to the number of shareholders, they report an insignificant relationship between number of shareholders and adverse selection bid-ask spread and PIN. For NASDAQ stocks, Jacoby & Zheng (2010) document a positive relationship between blockholders and bid-ask spread. In contrast, they report a positive relationship between trading volume and blockholders. However, they conclude a positive relationship between number of shareholders and dollar volume and an insignificant relationship between PIN and quoted depth.

Recent literature has documented that using the blockholders as a sole measure of ownership concentration causes bias in the results (Comerton-Forde & Rydge 2006; Jacoby & Zheng 2010; Rubin 2007). These studies used different proxies of ownership concentration in order to reduce any bias from the arbitrary cut-off point that has been used in order to measure the blockholders; moreover, the shareholder rights can differ significantly across countries and even across firms within the same country. For example, some countries' corporate law prescribes discrete control thresholds that give a blocking veto power over major decisions. In the US, the cut-off point is 5% and more of the share capital (Brockman et al., 2009; Heflin & Shaw 2000). In the UK, the cut- off point is 3% and 5% and more of the share capital (Short & Keasey 1999).

Consequently, findings of the existing literature regard large shareholders as the most influential owners of a firm, which can influence corporate decisions in such a way that increases a firm's value (Claessens et al., 2000; La Porta et al., 1999). However, any active role of large shareholders also brings costs that reduce market liquidity. For example, Coffee (1991) was among the first to point out that active role of large shareholders and the liquidity of shares of their companies cannot go hand on hand. Moreover, Holmstrom & Tirole (1993, p. 701) document that "*If the proportion of the firm held by insiders decreases, there are more outside equity holders and hence more liquidity traders*. Nevertheless, the empirical evidence about the impact of large shareholders and market liquidity is comprehensive (Attig et al., 2006; Ginglinger & Hamon 2007; Naes 2004; Rubin 2007). A number of studies have suggested that large shareholders have a negative impact on market liquidity (Attig et al., 2006; Ginglinger & Hamon 2007).

For instance, Naes (2004) reports that there is a positive relationship between the aggregate top five large shareholders and quoted and effective bid-ask spread and adverse selection component of bid-ask spread. However, he reports that there is no relationship between ownership concentration and depth. In France, Ginglinger & Hamon (2007) report a positive relationship between controlled

shareholder and bid-ask spread and they suggest that controlled shareholders are informed traders for 918 French listed firms from 1998 to 2003. Moreover, they find that the deviation of control from ownership has a positive relationship with bid-ask spread and adverse selection component of bid-ask spread and an insignificant negative relationship with depth. In contrast, they find that there is no impact for widely held and double voting rights on market liquidity.

In Canada, Attig et al. (2006) examine the relationship between ultimate control ownership and market liquidity measured by quoted bid-ask spread and adverse selection component of bid-ask spread in a sample of 1031 Canadian listed firms. They reveal that there is a positive relationship between closely held firms and bid-ask spread and adverse selection component of bid-ask spread, whereas they conclude a negative relationship between widely held share and bid-ask spread. Furthermore, in Australia, Comerton-Forde & Rydge (2006) test the relationship between ownership concentration and illiquidity; different proxies of ownership concentration have been used such as the top twenty shareholders, large shareholders, retail shareholdings, number of shareholders and insider ownership. They report a positive relationship between concentration and bid-ask spread and a negative one with turnover ratio. However, they document a negative relationship between bid-ask spread and number of shareholders and a negative relationship between number of shareholders and turnover ratio. This is consistent with Amihud et al. (1999), who find that increasing shareholder numbers increases market liquidity. They apply a further check, which is the simultaneous Equation model; their findings provide no evidence to indicate that ownership variable is endogenous and therefore no simultaneous equation bias is present.

In summary, the review of the empirical papers that examine the effect of ownership level and concentration on market liquidity reveals several important gaps in the literature. In the first place, the number of empirical studies in this area is clearly limited and this explains the few papers that were discussed in the empirical review. In addition, the review indicates the need for this study in the UK since most of the above-mentioned studies come from the US market (Chiang & Venkatesh 1988; Dennis & Weston 2001; Kini & Mian 1995; Rubin 2007; Sarin et al., 2000; Zhou 2011), France (Ginglinger & Hamon 2007), Australia (Comerton-Forde & Rydge 2006), and Canada (Attig et al., 2006). However, as discussed in the first chapter, the differences in corporate governance arrangement, codes' rules and regulations between countries justify the need for more country-specific studies.

Further, the discussion of the empirical papers indicates that the evidence from the ownership level is limited. With the exception of Rubin (2007), these papers mainly focus on ownership concentration only and ignore the other ownership structure variables (Heflin & Shaw 2000; Brockman et al., 2009; Jacoby & Zheng 2010). To the best of the author's knowledge, this study is the first of its kind in the UK that investigates the effect of ownership level and concentration on market liquidity. The sample of this study includes FTSE All shares over the period between 2003 and 2012.

The ownership structure literature has documented that ownership variables are endogenously determined (Heflin & Shaw 2000; Comerton-Forde & Rydge 2006; Rubin 2007). Further, Poon et al. (2013) argue that endogeneity in the ownership structure-liquidity relationship arises from two sources, unobserved heterogeneity and simultaneity. The authors add that most of the empirical papers control for unobserved heterogeneity and simultaneity. Therefore, the estimation method used in examining the ownership structure on market liquidity is very important. The normal estimation methods such as OLS and fixed effect fail to control for all the endogeneity sources (Poon et al., 2013; Rubin 2007). Thus, part of the inconclusive results could be due to methodological issue in this area of research. For instance, the empirical review reveals that some studies do not control for the endogeneity problem at all (Chiang & Venkatesh 1988; Kini & Mian 1995). Furthermore, none of the above studies employs a pooled OLS dummy year and industry as their estimation method. However, in a more recent study, Poon et al. (2013) employ pooled OLS year and industry dummies in their investigation of the effect of institutional trading on market liquidity. Keeping in mind this recent development in the literature, this study follows Poon et al. (2013), and employ pooled OLS year and industry dummies in the investigation of ownership structure and market liquidity relationship.

From the above discussion, it is evident that researchers have empirically analysed the effect of different proxies of concentration ownership on market liquidity. The results reveal a complex relationship between ownership and market liquidity, requiring the researcher to take the identity of the respective owners into account, which will be discussed in the following section; before that, this study wants to shed some light on the ownership structure trend in the UK.

2.5 Ownership Structure Trends in the UK[5]

In the UK, the level of ownership by individuals has decreased over the last thirty years, whilst ownership by institutional investors has increased. For instance, in 1963, individual investors owned 54% of public shares in the UK. Over the years, the proportion of shares owned by this group fell steadily, in particular, by 1989, it dropped to just below 21%, and in 2012 it further dropped to only 14%. In contrast, as compared to the individual investors' level of share ownership, the ownership of shares by insurance companies and pension funds increased dramatically over the same period. For example, ownership by insurance companies increased from 10% in 1963 to 17% in 2012, whilst that of pension funds saw an increase to 16%. The large increase in pension funds' investment is mainly attributable to the outcome of the increase in pension contributions in publicly listed companies in the UK.

There is also been a notable increase in the level of ownership of overseas investments. In this regard, this is particularly noteworthy because the level of overseas investment increased from 7% in 1963 to 32% in 2012. It is also important to note that many of the overseas holdings are either the investors from the United States or the European Union. It is also well documented, that US investors are more proactive in corporate governance, which has influenced the behaviour of both institutional investors and companies' management in the UK. Nevertheless, the influence of overseas investors on corporate governance in the UK companies is only shown by their level of equity ownership in those companies.

From the corporate governance recommendations perspective, the Cadbury Committee (1992, p. 49), state that '*….we look to the institutions in particular to use their influence as owners to ensure that the companies in which they have invested comply with the Code*'. The committee regard that institutional investors have a special responsibility for ensuring their recommendations in their companies. A similar view was expressed in the recommendations of the Greenbury Report (1995, p, 19), where one of the main action points was described as suggesting that '*….institutional investors should use their power and influence to ensure the implementation of best practice as set out in the Code*'. In the same spirit, the Hampel Report (1998, p. 40) state that '*…..it is clear that a discussion of the role of shareholders in corporate governance will mainly concern the institutions*'. The outcome of these arguments suggests, that three different committees on corporate governance in the UK have greatly emphasised on the role of institutional investors. It

[5] 'ONS (Office for National Statistics) report 2012'.

can thus be argued, that institutional investors' potential to exert significant influence on companies has clear implications for corporate governance issues, especially in terms of the standards of corporate governance and issues concerned with enforcement. Furthermore, in relation to institutional shareholders, the Combined Code (2003) provides recommendations about principles of good governance.

As in the US, the UK governance system is market-based, characterised by liquid markets and dispersion company ownership, compared to the relationship-based systems of Japan and Germany where ownership is concentrated and markets are relatively illiquid. However, there are a number of differences between the US and the UK institutional systems. Unlike the US, where individuals are the largest investor category (Brankato 1997), in the UK most shares are owned by financial institutions. Moreover, the UK financial institutions are also highly concentrated and they invest most of their assets in equities (Faccio & Lasfer 2000). Despite their size and holdings, UK financial institutions do not target companies and they rarely cast their vote at the annual general meetings (Mallin 1997). This passivity of institutional investors in the UK does not mean that UK companies are free from agency costs problems. Previous studies show that UK companies suffer from the same agency costs as their US counterparts (Lasfer 1997). In addition, some recent concerns about the ways in which remuneration packages have been determined, the collapse of a number of large companies and the fraudulent use of the pension fund in some companies have highlighted instances where directors do not act in the best interests of shareholders. In this regard, it has also been documented that, institutional investors do not monitor because the resources and time required to interfere with management decision-making are considerable and they become active only in events of real disasters where they try turn over their portfolio more often (Financial Times 2000).

2.6 Owners' Identity and Market Liquidity

The previous discussion reviewed the theoretical and empirical papers on the relationship between ownership level, concentration and market liquidity. In this section, the discussion is related to the identity of owners, and how it influences market liquidity. Some studies in the existing literature has documented that the location of control rights can be a more important determinant of degree of control utilized by owners than ownership concentration in the aggregate form (Cubbin & Leech 1983; Mayer 1992). For instance, banks and holding companies have been identified as insiders, while the shareholders of diffusely held firms (institutional investors such as pension funds) are

viewed as outsiders. Given an emotional commitment, insider investors may be strongly interested in the success of the firm than investors for which the firm is just a piece in their portfolios. In short, it is open to empirical testing whether the identity of owners really matter or not. Consequently, many studies have documented that the presence of identity affects market liquidity differently (Barabanov & McNamara 2002; Jennings et al., 2002; Fehle 2004; Naes 2004; Rubin 2007; Choi et al., 2013).

Most of the above mentioned studies have investigated the effect of outsider' investors identity on market liquidity. For instance, Jennings et al. (2002) explore the relationship between institutional ownership and quoted bid-ask spread and the adverse selection component of bid-ask spread for NASDAQ firms Q1 of 1983 to Q3 of 1991. They report a strong positive relationship between independent advisor institution ownership and bid-ask spread and a weak positive relationship between investment companies ownership and bid-ask spread. Nevertheless, Barabanov & McNamara (2002) report a negative relationship between investment advisors institution ownership and bid-ask spread and an insignificant relationship between investment companies ownership and bid-ask spread. Moreover, Naes (2004) finds a negative relationship between state ownership and quoted depth and positive relationship between state ownership and bid-ask spread. Naes (2004) also reported a positive effect on bid-ask spread and a negative effect on the adverse selection component of bid-ask spread. With respect to foreign ownership, the results of Naes (2004) show a negative effect on bid-ask spread and positive effect on quoted depth.

However, some studies have also examined the insiders' identity effect on market liquidity. In the US, Heflin & Shaw (2000) investigate the impact of both insider manager and insider non-manager blockholders on market liquidity (measured by quoted, effective, and adverse selection components of bid-ask spread and depth), in 260 US listed firms, over the period from 1988 to 1989. They report a positive relationship between blockholders manager and non-manager and quoted and effective bid-ask spread, adverse selection component of bid-ask spread and smaller quoted depth. More recently, Brockman et al. (2009) examine the relationship between insider, outsider, and employee stock options (ESOP) and market liquidity (measured by real, information and total liquidity costs) for 1225 NYSE and AMEX companies over the period from 2000 to 2006. After controlling for the real friction effect, they find little evidence that insider; outsider and ESOP blockholders have a negative impact on the information friction. They also document a negative relationship between insider, outsider and ESOP blockholders and turnover and number of trades. They conclude that outsider blockholders has a negative and significant effects on turnover and

number of trades, whereas, ESOP has a negative and insignificant relationship with turnover and number of traders. With respect to trade size, they suggest that outsider blockholders have a positive effect on trade size, while insider and ESOP blockholders have a negative effect on trade size. Despite these findings, only a few studies have examined the role of both insider and outsider's identities in determining market liquidity. The next section reviews the owners' identity literature with market liquidity and pinpoints gaps in the existing literature in this area.

2.6.1 The Separate Effects of Executive and Non-Executive Directors' Ownership on Market Liquidity

Klein et al. (2002, p.318) observe that, "*in corporate finance, asymmetric information refers to the notion that firm's insiders, typically the managers, have better information than do market participants on the value of their firm's assets and investment opportunities*". Previously, this study has stated that there are two types of information asymmetry, moral hazard and adverse selection. From a moral hazard perspective, the divergence of interests among agents and principals imposes costs only to the extent that principals cannot write perfect contracts (Jensen & Meckling 1976; Miller 2002; Shleifer & Vishny 1997). Shareholders cannot write perfect contracts because of asymmetric information concerning the efforts and actions of agents. Agency costs occur because of the self-interested actions of the agents because the principals cannot directly monitor or measure the behaviour of agents (Haniffa & Hudaib 2006). Similarly, other studies argue that the existence of the agency costs is known to the market; however, the extent of that costs is not known (Fama & Jensen 1983; Jensen & Meckling 1976; Rosser 2003).

On the other hand, the ***adverse selection hypothesis*** postulates that those directors who are more familiar with the day-to-day operations of the company trade on more information that is valuable. This study's dataset distinguishes between two categories of directors: executive directors (the percentage of ordinary shares owned by directors who are executive) and non-executives (the percentage of shares owned by non-executives).This study lists the categories of insider in decreasing order with respect to the degree of information superiority they are supposed to possess. On average, there are two director identities (i.e., executives and non-executives) on the board of UK firms.

Furthermore, existing literature has revealed the importance of the information hierarchy hypothesis, which postulates that '*the information content of the transactions depends on the type*

of director who trades in capital market studies' (Seyhun 1986, p.193). For instance, directors who are familiar with the day-to-day operations of the company trade on information that is more valuable. Moreover, Jeng et al. (1999, p. 32) question whether insiders can benefit from their information advantage: "*Some insiders are more 'inside' than others*''. The chief executive, for example, is likely to have better information about the firm's prospects than lesser officers are. Since the CEO's trades are likely to be carefully examined, both by shareholders and by regulators, she/he may be more hesitant to trade on his/her informational advantage. Furthermore, the earlier support for the information hierarchy story by Seyhun (1986) and Lin & Howe (1990) may have been generated by transaction size. In these studies, CEOs' trades are twice as large, on average, as those by other officers or directors, and larger transactions trigger stronger price reactions.

To the best of the author's knowledge, only three previous studies have investigated the effect of director's type on market liquidity. In US data, Heflin & Shaw (2000) find that the aggregate managerial ownership has a negative impact on market liquidity. Moreover, they find that higher blockholders for both managers and non-managers leads to wider bid-ask spread, thinner depths, and higher adverse selection costs. They attribute these findings to informational frictions caused by differentially informed insiders (blockholders) and outside investors. Similar to that, in the Norwegian equity market Naes (2004) documents that the primary insider (board of directors and manager) has a negative impact on market liquidity. On the other hand, in ASE Comerton-Forde & Rydge (2006) find that the director ownership up to 10% increases market liquidity; they suggest that the monitoring benefits of insider ownership may be offset by entrenchment concerns at level of trading in the stock. In contrast, insider ownership greater than 10% has a negative impact on market liquidity.

This study follows Fidrmuc et al. (2006) definition of UK insiders as the legal insiders, which refers to executive and non-executive directors, in contrast to the US definition, where executives are would normally mean officers and non-executives as directors. Specifically, in the United States, an insider is defined as officers, directors, other key employees whom own more than 10% shares of any equity class (Lakonishok & Lee 2001). However, the UK definition of an insider is more narrow, which only include members of the board of directors (both executives and non-executives), and exclude other key employees and large shareholders. Most of the US studies only investigate the effect of the aggregate level of insider ownership on market liquidity (Chiang & Venkatesh 1988; Kini & Mian 1995; Sarin et al., 2000; Rubin 2007). However, outsider directors may have less inside information than insider directors. As a result, this study subdivides insider

ownership into executive and non-executive directors' ownership and tests their effect on market liquidity.

2.6.2 Financial Institutions' Ownership

Existing literature has suggested that, in contrast to other institutions, banks have a unique ability to trade against market-wide liquidity shocks because they experience funding flows and costs that correlate negatively with market liquidity (Gatev & Strahan 2006). This gives banks a unique ability to hedge against market-wide liquidity shocks. Therefore, ownership by banks could decrease the liquidity risk of stocks. In contrast to other institutional investors, commercial banks have funding flows that are negatively correlated with market liquidity. With regard to pension ownership, Coffee (1991) puts forward the notion of the '*optimal corporate monitor*' and comments that pension funds are more likely to fulfil the requirements of this role than other institutions. However, there are drawbacks to the argument especially regarding externally managed pension funds and large pension funds with highly diversified portfolios composed of relatively small shares of firm's capital, both of which serve to reduce the monitoring activity.

Some institutional investors have long-term positions. They rely on a deep knowledge of companies and are more interested in timely information. One form of such investors is the pension fund that "*a financial institution in charge of collecting, keeping and investing assets in order to pay future benefits to its members*" (Gatev & Strahan 2006, p 872). Pension funds trade with huge amounts of money. These institutions invest large amounts in financial markets across the world. These investors have active behaviour (Agarwal 2009). Aragon (2007) suggests that restrictions on fund withdrawal allow pension funds to have long-term investment horizons and act as suppliers of capital during liquidity crises. Monks & Minow (1995) presume that pension funds are considered to be long-term investors and are then unable to sell their assets easily. As a consequence, they are highly motivated to defend their assets and have a strong influence on corporate governance code of practices. Useem et al. (1993) show that pension funds may employ pressure on managers by forcing company governance rules that aim at facilitating monitoring of companies. Bushee & Noe (2000) and Dennis & Strickland (2005) document strong evidence that pension funds are motivated to demand liquidity on days with large abnormal returns.

Few studies have investigated the effect of outside blockholders' identity on market liquidity (Fehle 2004; Ginglinger & Hamon 2007; Naes 2004). In France, Ginglinger & Hamon (2007) find that

shareholders with double voting right shares prevent informed shareholders from trading on private information, as such trading would lead them to lose their double voting right; as a result information asymmetry is decreased as market liquidity is improved. In a US study, Fehle (2004) investigates the relationship between bid-ask spread, measured both as effective and posted spread and as institutional ownership, using a sample of 10107 NYSE stocks for 1980-1996. He finds that there is a negative relationship between institutional ownership and spread. In the subsequent analysis of the effect of different institutional blockholders' identities, Fehle (2004) reports that the positive effect of institutional ownership only holds for mutual funds; however, there is a negative relationship between commercial banks and investment managers and market liquidity. For insurance companies and pension funds, the relationship is insignificant.

Moreover, Fehle (2004) indicate that higher institutional ownership lowers the bid-ask spread, which is inconsistent with the idea that institutions drive up bid-ask spread due to the adverse selection costs. For both effective and posted bid-ask spread, the ownership share and total number of commercial banks and investment managers have a positive and significant relationship with effective and quoted bid- ask spread that is consistent with the notion that the presence of these institutions in the ownership structure increases the bid-ask spread. However, mutual funds and insurance companies' ownership have a negative and significant relationship with effective and quoted bid- ask spread.

Jennings et al. (2002) partition the institutional ownership into five institutional types and find a heterogeneous relationship between institutional ownership and market liquidity across the types. Specifically, they report a negative relationship between institutional ownership and bid-ask spread is strongest for commercial banks and insurance companies, while there is no relationship between bid-ask spread and pension, foundation, endowment and employee stock option (ESOPs). This heterogeneity is consistent with the notion that the impact on the informational environment of institutional ownership depends on the nature of the institution. Moreover, large blockholders have a positive and significant effect.

2.6.3 Foreign Ownership and Market Liquidity

Financial liberalisation simplifies the opening of domestic markets to international investors with the intent of providing diversification of benefits and lowering the required risk premium (Warther 1995), and ultimately improving market liquidity (Levine 2001). Foreign capital has become an

important source of finance (Bekaert et al., 2002). Foreign investors show a preference for large firms with low insider ownership, stocks that are associated with lower information asymmetry (Bushee & Noe 2000; Ferreira & Matos 2008), liquidity and international presence (Dahlquist & Robertson 2001). Thus, foreign investors contribute to market liquidity. Nevertheless, since they are geographically away from the firm, they may seek more information about the firm (see, for example, Choe et al., 2005; Huang & Shiu 2005; Seasholes 2004).

It is thus debated, that foreign institutional investors are less likely to have a positive impact on market liquidity. This is because foreign institutional investors are perceived to be better traders given that they are better informed (Grinblatt & Keloharju 2000; Seasholes 2004). They may thus monitor corporate management better than local institutions (Khanna & Palepu 1999). In addition, they would create more timely and accurate forecasts than local analysts (Bachmann & Bolliger 2001). Another possible reason for a negative impact of foreign institutional investors' participation is that a shift in the majority ownership to foreign institutions may weaken the informal information channels that exist between local governments and industries in the capital market. As a result, foreign ownership may have a negative impact on market liquidity as reported in (Rhee & Wang 2009).

In contrast, there is also evidence on the positive relationship between market liquidity and foreign institutional investors' shareholding. In this regard, findings of some existing studies suggest that institutional trading is more likely information driven (Bushee & Goodman 2007; Ke & Petron 2004). In addition, findings of other studies provide the evidence suggesting that foreign institutional investors are more experienced, better trained or even better informed and are therefore, regarded as better traders (Ginblatt & Keloharju 2000; Seasholes 2004). These traders are also been regarded by other studies as those who can better monitor a firm's corporate management than local institutions (see for example, Khanna & Palepu 1999).

There is also evidence in the existing literature which document that foreign institutions will exercise pressure on firms to increase disclosure, which will reduce information asymmetries between buyers and sellers of shares and increase market liquidity (Diamond & Verrachia 1991, Heflin et al., 2005). Foreign blockholders have been linked to increase in firms' investments (Cronqvist & Fahlenbrach 2009), and anticipation of earnings manipulation (Farber 2005), which will contribute to market liquidity. There is also evidence, which suggest that participation of large international financial institutions in companies ownership structure result in the production of

better information disclosure and more active trading which improve market liquidity (Stulz 1999). However, in the existing literature only a few studies directly address the issue of how participation of foreign institutions affects market liquidity (Bekaert et al., 2007). I would thus argue that inclusion of foreign institutional investors in companies' capital structure increase (or decrease) market liquidity, which has direct implications for asset pricing, corporate governance and regulation. I therefore include foreign institutional ownership as one of the determinant of market liquidity in this research.

2.6.4 Free Float Ownership and Market Liquidity

The term free float is used interchangeably with diffused ownership by the existing literature. Ragazzi (1981, p. 262) defines the free float or diffused firm ownership as '*the one where a firm's shares are owned by several individuals who cannot take control of the firm or is not able get any benefits other than those available to other shareholders and whose top managers do not receive either direct or indirect benefits other than a market salary'*. In this regard, existing literature show a negative relationship between ownership concentration and free float shares in the market (Bhide 1993; Holmstrom & Tirole 1993; Bolton & Von Thadden 1998). Holmstrom & Tirole (1993) argue that dispersed shareholders have fewer incentives for information production if the float on a stock is smaller. Similarly, Bolton & Von Thadden (1998) document that the threat of takeovers is reduced when the float share is small. Moreover, Bhide (1993) explores that large holding by active stockholders will reduce the float of stock that is free to trade, which would result in less active and continuous trading, and as a result, the market maker will widen the bid-ask spread.

The existing literature also documents that retail shareholders are unlikely to be informed, which is expected to increase market liquidity. For instance, Comerton-Forde & Rydge (2006) suggest that retail shareholders ownership has a positive relationship with turnover ratio and negative relationship with the bid-ask spread. However, the relationship is weak. This finding supports the view that when retail shareholders trade, they trade for liquidity reasons which would mean that they are uninformed investors. Moreover, previous literature has documented that the larger the market capitalisation of a stock, the greater its market liquidity and if the market participants are subjected to information asymmetry, then the number of investors willing to invest in a particular stock, in expectation of the potential gains from the trade (Bolten & Von Thadden 1998).

Nevertheless, when a firm has controlling shareholders, the number of shares available for trading reduces, which may reduce market liquidity. In other words, ownership concentration can cause a separation between free float and market capitalisation and as a result, when this happens, then fewer shares are traded in the market, which eventually reduces market liquidity. In addition, given the assumption that blockholders may have private information regarding the firm, a higher probability of informed trading will cause the bid-ask spread to widen. In line with these arguments, Ginglinger & Hamon (2012) examine the free float or trading hypothesis on a sample of 918 firms traded on the French stock exchange for the period 1998-2003. They argue, that as there is a positive relationship between free float and market liquidity, their results suggest a significantly lower liquidity for firms with large insider blockholders ownership.

The above-mentioned discussions suggest that existing evidence on the relationship between owners' identity and market liquidity is limited and inconclusive, which specify gaps in the literature. In addition, the review indicates the need for this study in the UK since most of the above-mentioned studies are based on the US and other markets (Barabanov & McNamara 2002; Fehle 2004; Naes 2004; Ginglinger & Hamon 2012; Poon et al., 2013) with only Park (2009) covering the UK market. However, as discussed before, there are differences in corporate governance mechanisms, disclosure requirements and regulations, between countries, which would justify the need for more country-specific studies, in particular, in the context of the UK.

Further, the discussion of the empirical papers indicates that the evidence from the insider owners' identity is limited. With the exception of Heflin & Shaw (2000) most of the published studies in this area mainly focus on outsider owners' identity only and ignore the insiders' identity (Barabanov & McNamara 2002; Fehle 2004; Park 2009; Poon et al., 2013). I would thus argue that this study is the first of its kind in the UK that investigates the effect of owners' identity for both insider and outsider market on market liquidity.

The ownership structure literature has also documented that ownership variables are endogenously determined (Naes 2004; Poon et al., 2013; Rubin 2007). Further, Poon et al. (2013) argue that endogeneity in the ownership structure-liquidity relationship arises from two sources, unobserved heterogeneity and simultaneity. The authors add that most of the empirical papers control for unobserved heterogeneity and simultaneity. Therefore, the estimation method used in examining the ownership structure on market liquidity is very important. The normal estimation methods such as OLS and fixed effect fail to control for all the endogeneity sources (Poon et al., 2013). Thus, part

of the inconclusive results could be attributed to the methodological issue. For instance, the empirical review reveals that some papers do not control for the endogeneity problem at all (Chiang & Venkatesh 1988; Kini & Mian 1995). Furthermore, none of the above studies employs a pooled OLS dummy year and industry in the estimation method. Recently, however, Poon et al. (2013) did employ the pooled OLS dummy year and industry in their study. In this study, and following Poon et al. (2013), the analysis is performed using pooled OLS dummy year and industry.

Few studies have linked the owners' identity with market liquidity. Moreover, in the UK to the best of the author's knowledge Park (2009) is the only study that examines the effect of outsider blockholders' identities on market liquidity measured by quoted and relative bid-ask spread, and Amihud (2002) illiquidity ratio. In particular, he tests the effect of free float shares, foreign holding, investment companies, pension fund, government, employee, cross holding and other holding on the above-mentioned measures of market liquidity. Using a 156 FTSE 100 and 250 from May 2002 to April 2009, he documents that there is a negative relationship between free float shares and quoted and relative bid-ask spread and Amihud (2002) illiquidity ratio. In contrast, he reports a negative relationship between foreign holding, investment companies, pension fund, government, employee, cross holding and other holding and quoted bid-ask spread, relative bid-ask spread, and Amihud (2002) illiquidity ratio.

In addition, few papers examine the impact of free float on market liquidity (Jacoby & Zheng 2010), while the rest of the papers focus on blockholders. The findings are mixed and inconclusive, which highlights the need for more work on this topic. Further, all the mentioned studies are conducted in the US, which implies the need for more investigation using a sample from the UK corporate boards. To the author's knowledge, this is the first study in the UK that examines the effect of ownership level, concentration and owners' identity on market liquidity. Accordingly, this study aims to extend this literature and provide evidence from the UK public listed firms. The sample of this study is more comprehensive as it includes all the small and large firms listed in the FTSE All-Share Index.

2.7 Ownership Level, Concentration, Owners' Identity and Market Liquidity during the Recent Financial Crisis

The recent financial crisis serves as a wake-up call that requires quick corporate governance reform and intervention (Kirkpatrick 2009). The recent crisis of 2007-2009 has been described as the worst

global crisis since the Great Depression (Crotty 2009). The negative consequences of the crisis globally have affected most of the international capital markets, risk management and market liquidity (Garleanu & Pedersen 2007; Poon et al., 2013). Adams (2012) suggests that the current crisis hit emerging markets and this one initiated in the US economy. Strong corporate governance and legal system (Adams 2012) characterise the American economy.

Many scholars agree that corporate governance mechanisms fail to perform their duties even in a developed economy such as the US. Existing literature states that institutional investors seem to adopt a passive stance towards monitoring and disciplining a firm's management (Plender 1997; Maug 1998). Prior studies have suggested that institutional investors rarely take action in corporate monitoring because they view liquidity as more important than building up the concentrated ownership required to have an influence on corporate management (Bhide 1993; Coffee 1991). Moreover, institutional shareholders are blamed for their passivity and their focus on short-term rather long-term returns during the crisis (Chen & Poon 2007; Chu & Song 2010; Mitton 2002). Consequently, most corporate governance codes around the world emphasise the importance of institutional investors in corporate governance mechanisms.

In the UK, the Walker Review (2009) recommended that the institutional Stewardship Code should be adopted as an official UK code of practice for institutional investors. As a result, the UK Stewardship Code (2010) has been established, which strongly focuses on enhancing the quality of engagement between institutional investors and companies to help improve long-term returns to shareholders and the efficient exercise of governance responsibilities. Likewise, the recent Stewardship Code (2012) seeks to inspire institutional shareholders to play a more active role in corporate governance. For instance, the main aim behind the Stewardship Code (2012) is to increase the accountability of institutional investors to their ultimate beneficiaries with respect to engagement activities. It will require institutional investors to publicly disclose their commitment to a stewardship obligation or to explain their alternative investment approach if they are unwilling to assume such a commitment.

Several related studies have considered the effect of ownership structure during the recent financial crisis. However, the majority of these studies focus on firm performance while limited research evidence is available on market liquidity. Additionally, most of the empirical literature in this area that has studied the ownership structure during the recent crisis relies on data from the US. The findings of these papers in general are mixed and inconclusive.

Cao & Petrasek (2012) provide evidence from a US market sample of 1225 firms over the period between 1989 and 2009. Their results suggest that stocks held by hedge funds as marginal investors are more sensitive to changes in aggregate liquidity than comparable stocks held by other types of institutions or by individuals; stocks held by hedge funds also experience significantly negative abnormal returns during the liquidity crisis. The empirical results support the hypothesis that institutional ownership affects the liquidity risk of stocks. Stocks in which hedge funds are marginal investors have returns that are more sensitive to changes in aggregate liquidity than stocks held by individuals. In contrast, stocks in which commercial banks are marginal investors tend to be less exposed to market liquidity fluctuations.

In particular, they find a significant and positive relationship between hedge fund ownership and liquidity risk of stocks. Hedge fund ownership has a significantly larger effect on liquidity risk than mutual fund ownership by other identity of institutional investors. Furthermore, the effect of hedge fund ownership on liquidity risk is most pronounced during a liquidity crisis. They note that all institutional investors – whether US foreign, non-US foreign, or domestic – have significant effects on overall stock performance. We find a similar role for both foreign and domestic institutional investors in propagating the liquidity shock among stocks in their portfolios. These findings support the model of Brunnermeier & Pedersen (2009) in which adverse liquidity shocks force levered institutions such as hedge funds to reduce their leverage by selling off assets, leading to decline in asset prices and liquidity.

In contrast, stocks held by commercial banks as marginal investors have a significantly lower liquidity risk than comparable stocks held by other types of institutional investors or by individual investors; also, bank ownership in the quarter preceding a liquidity crisis is positively associated with abnormal stock returns during the liquidity crisis. These results provide supporting evidence for the hypothesis of Gatev & Strahan (2006) that a bank has a unique ability to hedge against market-wide liquidity shocks. Similar to that, Brunnermeier & Pedersen (2009) propose a model that relates liquidity risk to ownership by levered speculators such as hedge funds. In their model, adverse funding shocks force hedge funds to liquidate their positions during liquidity crisis at depressed prices, thus increasing the covariance between asset returns and market liquidity. An implication of their model is that assets held by levered speculators such as hedge funds are more likely to be sold off following a decline in market liquidity.

Poon et al. (2013) examine how institutional trading and holding is related to market liquidity and liquidity risk pre and during the recent financial crisis, 2007-2008, in the US market. Market liquidity is measured as bid-ask spread and liquidity risk. They document that the number of institutional investors is positive and significant with quoted bid-ask spread both pre and during the crisis period. However, institutional holdings decrease quoted bid-ask spread pre and within the crisis period. With respect to owners' identity, they conclude that there is a positive relationship between number of bank, insurance, independent advisors and university and endowment shareholder and bid-ask spread in the pre-crisis period and during the crisis period. Moreover, they report a negative relationship between ownership of bank, insurance, independent advisors and university and endowment and bid-ask spread in the pre-crisis period and during the crisis period. Nevertheless, regarding pension fund, Poon et al. (2013) document a negative relationship between number of pensions and bid-ask spread in the pre-crisis period and a positive one during the crisis period, and a negative relationship between ownership of pension fund during the crisis period.

In summary, the evidence on how the ownership level, concentration and owners' identity is related to the market liquidity during the recent financial crisis has been limited to large firms and uses only two periods, i.e., pre-crisis and crisis periods, and, more importantly, is inconclusive. This study divides the sample period into three sub-samples: pre-crisis, crisis and post-crisis periods, and then examines the effect of ownership level, concentration and owners' identity on market liquidity during these periods for FTSE all share firms.

2.8 Summary

The first part of this chapter has reviewed the theoretical and empirical work on the ownership structure-liquidity relationship. In this regard, the review relies mainly on agency theory. The focus of this theory is on the agency problems that arise between the agent and the principal, due to the divergence of interest. However, adverse selection and trading hypothesis is the most popular theoretical background and receives much attention from researchers in the ownership-liquidity area. Further, trading theory offers a powerful tool for providing an insight into the ownership concentration-liquidity relationship. This study therefore takes these theories as the main theoretical framework in examining the ownership-liquidity relationship. Further, the empirical work on the ownership structure-liquidity relationship have also been reviewed where evidence of the existing literature indicates that the insider, institutional and ownership concentration is relevant to market liquidity. However, evidence from the exiting empirical literature is mixed and inconclusive.

Likewise, the review also examines the empirical papers on the ownership-liquidity relationship during the recent financial crisis.

The second part of this chapter has reviewed the theoretical and empirical literature on owners' identity and market liquidity. This part of the review relies on different theories, such as the adverse selection and trading hypothesis. In this regard, the existing academic literature provides support for the importance of the role of owners' identity on market liquidity. Further, the empirical review of the owners' identity-market liquidity relationship has provided mixed results. However, the empirical evidence indicates that different owner identities have different impacts on market liquidity. The next chapter explains the research methodology and the data collection process for this study. Table 2.1 is provided, at the end of this chapter, which presents a summary of representative studies on ownership structure and market liquidity to highlight the gaps in the existing literature.

Table 2.1 Key Studies on the Relationship between Ownership Level, Concentration, Owners' Identity and Market Liquidity

Study	Sample Characteristics	Dependent Variable(s)	Independent Variable(s)	Estimation Method	Main Findings
Chiang & Venkatesh (1988)	63 NYSE Jan-Dec 1973	Insider and institutional ownership	Quoted bid-ask spread	Cross-sectional regression	1. Insider ownership has a positive impact on bid-ask spread. 2. There is no relationship between institutional ownership and bid-ask spread.
Kini & Mian (1995)	1063 NYSE 1985	Insider ownership, insider trading, institutional ownership and blockholdings	Quoted bid-ask spread	OLS	1. There is a positive relationship blockholders and bid-ask spread. 2. There is a negative relationship between insider trading and bid-ask spread. 3. There is a positive relationship between insider ownership and bid-ask spread. 4. There is no relationship between institutional ownership and bid-ask spread.
Sarin et al. (2000)	786 firms AMEX & NYSE, 1985	Insiders and institutional ownership	Relative bid-ask spread, daily weighted average bid-ask spread	OLS and simultaneous equations	1. There is a positive relationship between insider ownership and adverse selection component of bid-ask spread. 2. There is a positive relationship between institutional ownership and bid-ask spread. 3. There is a negative relationship between institutional ownership and depth.
Heflin & Shaw (2000)	260 firms, 259 NYSE/1 AMEX 1988-1989	Total blockholdings; insider manager blockholders, non- insider blockholders and managerial ownership.	Total quoted depth, relative bid-ask spread, effective bid-ask spread	Cross-sectional regression and simultaneous equation model	1. There is a positive relationship between the aggregate level of blockholders and effective and relative bid-ask spread. 2. There is a negative relationship between the aggregate level of blockholders and depth. 3. There is a positive relationship between insider managers and non-manager blockholders and effective and relative bid-ask spread.

					4. There is a negative relationship between insider managers and non-manager blockholders and depth. 5. There is a positive relationship between managerial ownership and effective and relative bid-ask spread and a negative relationship with depth.
Dennis & Weston (2001)	5500 firms NYSE, AMEX, NASDAQ; Q4 1997-Q4 1998	Insiders and institutional ownership	Quoted bid-ask spread, relative bid-ask spread, adverse selection component of bid-ask spread and price impact ratio and probability of informed traders (PIN)	Two stage least squares regression, and simultaneous equation model	1. There is a positive relationship between insider ownership and adverse selection component of bid-ask spread. 2. There is a positive relationship between institutional ownership and adverse selection component of bid-ask spread. 3. There is a positive relationship between institutional ownership and bid-ask spread.
Barabanov & McNamara (2002)	NASDAQ (1983-2000)	Total institutional ownership, Herfindah Index, banks, insurance, investment companies, independent investment advisors and other (universities and foundations' endowment).	Bid-ask spread and relative bid-ask spread.	OLS and 2SLS	1. There is a negative relationship between institutional ownership and bid-ask spread. 2. There is a positive relationship between institutional concentration ownership and bid-ask spread. 3. There is a strongly negative relationship between independent investment advisors ownership and bid-ask spread in comparison with investment companies, banks and insurance companies and other institutions' ownership that has a lower negative relationship with bid-ask spread.
Naes (2004)	94 firms Norway, 1999-2001	Aggregate ownership and Herfindah Index of state, institutions, non-financial, individual, and foreign and primary insiders and five largest owners.	Quoted bid-ask spread; effective bid-ask spread, relative bid-ask spread, adverse selection costs and quoted depth.	Fixed effect panel regression, Granger causality	1. There is no significant relationship between institutional ownership and quoted, effective, relative and adverse selection component of bid- ask spread. 2. There is a negative relationship between state ownership and depth and a positive relationship with quoted, effective, relative and adverse selection component of bid-ask spread.

					3. There is a positive relationship between non-financial firms and bid-ask spread and negative effects on adverse selection component of bid-ask spread. 4. There is a negative relationship between foreign ownership and bid-ask spread and a positive one with depth.
Fehle (2004)	10107 stocks NYSE 1980-1996	Total institutions, banks, mutual funds, investment managers and pension funds	Posted bid-ask spread and effective bid-ask spread.	GLS	1. There is a negative relationship between institutional ownership and quoted bid-ask spread. 2. There is a positive relationship between mutual fund ownership and posted bid-ask spread and effective bid-ask spread. 3. There is a negative relationship between commercial banks and investment managers and posted bid-ask spread and effective bid-ask spread. 4. There is an insignificant relationship between insurance companies and pension funds and posted bid-ask spread and effective bid-ask spread.
Attig et al. (2006)	1031 Canada firms 1996	Ultimate ownership, control ownership and the differences between ultimate and control ownership	Bid- ask spread, relative bid- ask spread and adverse selection component of bid-ask spread.	Cross-sectional regression	1. There is a positive relationship between ultimate control ownership and bid-ask spread, relative bid-ask spread and adverse selection component of bid-ask spread. 2. There is a positive relationship between closely held shares and bid-ask spread, relative bid-ask spread and adverse selection component of bid-ask spread. 3. There is a negative relationship between widely held shares and bid-ask spread, relative bid-ask spread and adverse selection component of bid-ask spread.

Comerton-Forde& Rydge (2006)	ASE, 1998-2003	Ownership concentration, insider, institutional and retail ownership	Amihud (2002), turnover ratio, and relative bid-ask spread.	OLS+ simultaneous equation	1. There is a positive relationship between ownership concentration and relative bid-ask spread and a negative relationship with turnover ratio. 2. There is a positive relationship between insider ownership and relative bid-ask spread and a negative relationship with turnover ratio. 3. There is a negative relationship between institutional ownership and relative bid-ask spread and a positive relationship with turnover ratio. 4. There is a negative relationship between retail ownership and relative bid-ask spread and a positive relationship with turnover ratio.
Ginglinger & Hamon (2007)	1550 firm France, 1998-2003	Blockholders, pyramid structure, double voting rights	Number of trades, turnover, depth, relative bid-ask spread.	OLS	1. There is a positive relationship between blockholders and relative bid-ask spread and a negative relationship with number of trades, turnover and depth. 2. There is a positive relationship between pyramid structure and relative bid-ask spread and a negative relationship with number of trades, turnover and depth. 3. There is a negative relationship between double voting right and relative bid-ask spread and a positive relationship with number of trades, turnover and depth. 4. There is a negative relationship between blockholders and relative bid-ask spread and a negative relationship with number of trades, turnover and depth.

Rubin (2007)	1369 firms NYSE 1993-2003	Insider ownership, institutional ownership, blockholders and largest shareholders.	Bid-ask spread, effective bid- ask spread, realised bid-ask spread, Amihud (2002) and dollar depth.	OLS and simultaneous equations	1. There is a positive relationship between institutional ownership and depth. 2. There is a negative relationship between institutional ownership and quoted, relative bid-ask spread and Amihud (2002) illiquidity ratio. 3. There is a negative relationship between institutional blockholders' ownership and depth. 4. There is a positive relationship between institutional blockholders' ownership and quoted, relative bid-ask spread and Amihud (2002) illiquidity ratio. 5. There is a negative relationship between large shareholders and depth. 6. There is a positive relationship between large shareholders and quoted, relative bid-ask spread and Amihud (2002) illiquidity ratio. 7. There is a negative relationship between insider ownership and depth. 8. There is a positive relationship between insider ownership and quoted, relative bid-ask spread and Amihud (2002) illiquidity ratio.
Park (2009)	156 FTSE 100 and 250 from May 2002 to April 2009	Free float shares, foreign holding, investment companies, pension fund, government, employee, cross holding and other holding	Quoted bid-ask spread, relative bid-ask spread, and Amihud (2002) illiquidity ratio.		1. There is a negative relationship between free float shares and quoted bid-ask spread, relative bid-ask spread, and Amihud (2002) illiquidity ratio. 2. There is a negative relationship between foreign holding, investment companies, pension fund, government, employee, cross holding and other holding and quoted bid-ask spread, relative bid-ask spread, and Amihud (2002) illiquidity ratio.

Brockman et al. (2009)	1225 NYSE, AMEX 1992-2001	Blockholders, insider blockholders, outsider blockholders and employee stock option blockholders	Relative bid-ask spread , quoted bid-ask spread, relative bid-ask effective and depths, number of trades, trade size and turnover ratio	Cross-sectional regression	1. There is a positive relationship between blockholders and relative and quoted bid-ask spread, and Amihud (2002) illiquidity ratio. 2. There is a positive relationship between insider blockholders and relative and quoted bid-ask spread, and Amihud (2002) illiquidity ratio. 3. There is a positive relationship between outsider blockholders and relative and quoted bid-ask spread, and Amihud (2002) illiquidity ratio. 4. There is a positive relationship between employee stock option blockholders and relative and quoted bid-ask spread, and Amihud (2002) illiquidity ratio. 5. There is a negative relationship between blockholders and number of trades and turnover ratio. 6. There is a negative relationship between insider blockholders and number of trades and turnover ratio. 7. There is a negative relationship between outsider blockholders and number of trades and turnover ratio. 8. There is a negative but insignificant relationship between employee stock option blockholders and number of trades and turnover ratio. 9. With respect to the trade size, they suggest that outside blockholders have a positive effect on trade size, while inside and ESOP blockholders have a negative effect on trade size.

					10. After they control for the trading activity measure of market liquidity they find that the relationship between blockholders, insider blockholders, outsider blockholders and employee stock option becomes negatively correlated with relative, quoted bid-ask spread and Amihud (2002) illiquidity ratio.
Jacoby & Zheng (2010)	1071 NYSE, 323 AMEX, 2182 NASDAQ/1995	Number of shareholders and blockholders	Bid-ask spread, PIN, depth, volume	Cross-sectional regression	1. There is a positive relationship between blockholders and bid-ask spread and probability of informed traders. 2. There is a negative relationship between blockholders and trading volume and depth. 3. There is a positive relationship between number of shareholders and bid-ask spread and probability of informed traders. 4. There is a negative relationship between number of shareholders and trading volume and depth.
Zhou (2011)	NYSE 838 insider, 1491 institutional	insider and institutional ownership	Bid-ask spread and depth	Cross-sectional regression	1. There is a positive relationship between insider ownership and bid-ask spread and a negative impact on depth. 2. There is a negative relationship between insider ownership and bid-ask spread and a positive impact on depth.
Blume & Keim (2012)	US 1980-2010	institutional ownership (institutions and number of institutions that own the stock)	Price impact ratio Amihud (2002)	Cross-sectional regression	1. There is a negative relationship between institutional ownership and Amihud (2002) illiquidity ratio. 2. They find that hedge funds prefer to invest in small firms rather than large ones.

Poon et al. (2013)	S&P 1500 index 2004 to 2008	Number of shareholders and institutional ownership; banks, insurance companies, independent advisors, public pension fund, university and endowment foundations.	Bid- ask spread and liquidity risk	Pooled OLS industry and year dummy Change in variables' regression	1. There is a positive relationship between number of institutions and bid-ask spread in the pre-crisis and crisis periods. 2. There is a negative relationship between institutional ownership and bid-ask spread in the pre-crisis and crisis periods. 3. There is a positive relationship between number of banks, insurance, independent advisors and university and endowment shareholders and bid-ask spread in the pre-crisis period and during the crisis period. 4. There is a negative relationship between ownership of banks, insurance, independent advisors and university and endowment and bid-ask spread in the pre-crisis period and during the crisis period. 5. There is a negative relationship between number of pension funds and bid-ask spread in the pre-crisis period and positive during the crisis period. 6. There is a negative relationship between ownership of pension funds during the crisis period.

Chapter 3

Research Methodology and Data

3.1 Introduction

The previous chapter provided a comprehensive discussion of the ownership structure-liquidity literature that is relevant to this study. The discussion reveals that there are two theoretical streams to investigate the relationship between ownership structure and market liquidity. On the one hand, there is the market microstructure literature, which states that, when informed shareholders possess superior information about a firm's private information compared to outside shareholders, an information asymmetry arises, which reduces market liquidity (Easley & O'Hara 1987; Glosten & Milgrom 1985; Grossman & Stiglitz 1980; Kyle 1985). On the other hand, there is the liquidity trade-off perspective, which posits that large shareholders who reduce the agency problem create another problem in the market, the so-called adverse selection problem (Bhide 1993). Based on this theoretical background, this chapter explains the research methodology adopted in this thesis.

The research methodology chapter in this thesis is of utmost importance, as it intends to confirm the robustness and validity of the empirical results. The chapter, therefore, provides a brief description of the research methodology and data. In the first place, the research philosophy adopted in this study has reported and explained. Further, this chapter provide details about the data collection process and the measurements and definition of variables. This chapter also describes and explain the models' specifications and details of the estimation methods that have been adopted and used in the empirical chapters.

The rest of this chapter is organised as follows. Section 3.2 discusses the research models development. Section 3.3 presents the definitions and measurements of variables. Section 3.4 presents the data collection procedures, sources and the main criteria used for the sample construction. Section 3.5 provides details of the econometric issues. Furthermore, section 3.6 explains the analytical strategies that this study adopts in dealing with different econometric problems. Section 3.7 describes the main estimation method used for the data analysis. Finally, section 3.8, concludes this chapter and generate links with the next chapter.

3.2 The Research Models Development

The issue of market liquidity determinants has stimulated a lot of research in finance literature. Since the seminal theoretical work of Demsetz (1968), who concludes that trading volume (*VO),* number of trades *(NT),* volatility (*VOL),* firm size *(MV*), share price *(P*), and number of shareholders (*NS*) are the main determinants of market liquidity, many theoretical studies have been conducted which show the determinants of market liquidity. For instance, Tinic (1972), Tinic & West (1972) and Stoll (1978) explained the determinants of market liquidity from the specialist perspective and added two more determinants (number of dealers (*ND*) and the capital of dealers (CD)) to the work of Demsetz (1968). Based on the outcome of all the above-mentioned studies we assume a linear parametric form for all the explanatory variables of market liquidity and form the following model.

$$LIQ_{it}=\alpha_0+\beta_1 MV_{it}+\beta_2 VO_{it}+\beta_3\ NT_{it}+\beta_4\ P_{it}+\beta_5 VOL_{it}+\beta_6\ NS_{it}+\beta_7\ ND_{it}+\beta_8\ CD_{it}+\varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

However, empirically Benston & Hagerman (1974) investigate the determinants of bid-ask spread in over-the-counter markets for a randomly drawn sample of 314 stocks from 1963 to 1967. They argue that unsystematic risk captures the importance of firm-specific events for firm valuations and the potential gains by informed traders, mainly insider traders. They also show a positive relationship between the bid-ask spread and unsystematic risk. Later on, by following, Benston & Hagerman (1974) several studies have investigated the determinants of market liquidity from a ***trading perspective***. In particular, at the beginning of the 1980s, the theoretical work has been devoted to show how the specialists (i.e., dealers) respond to potential informed traders (Copeland & Galai 1983; Easley & O'Hara 1987; Glosten & Milgrom 1985; Glosten & Harris 1988). These studies assume that the market maker cannot infer whether traders are information motivated or liquidity motivated. More specifically, most of these studies predict the bid-ask spread as an increasing function of the level of information asymmetry (*IA*), which is faced by the market maker. This would mean that an increase in insider holding gives a higher probability of informed trading. In light of these discussions, we include the level of information asymmetry as a determinant of market liquidity LIQi and form the following model.

$$LIQ_{it}=\alpha_0+\beta_1 MV_{it}+\beta_2 VO_{it}+\beta_3 NT_{it}+\beta_4 TZ_i t+\beta_5 P_{it}+\beta_6 VOL_i t+\beta_7 IA_{it}+\varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2)$$

Furthermore, as reported in previous literature, institutional investors turn over their portfolio more often, which reduces transaction costs and increases market liquidity (Demsetz 1968; Merton 1987; Schwartz & Shapiro 1992). Thus, to the extent that institutions as a group trade more often,

institutional ownership should reduce a market maker's required inventory, which in turn may reduce the bid-ask spread (Gompers & Metrick 2001; Hamilton 1978; Schwartz & Shapiro 1992; Tinic 1972). More recently, other studies suggest that in contrast to other shareholder groups, insiders are subject to legal restrictions and in order to liquidate their holdings they are more likely to trade predominantly on the sell side (Bettis et al., 2000; Rubin 2007). However, an increase in institutional ownership, is also expected to lead to increase in trading volume, the number of trades, visibility, and analyst coverage (Schwartz & Shapiro 1992)

Similarly, other empirical studies have highlighted the role of ownership structure on market liquidity (see for example, Chiang & Venkatesh 1988; Kini & Mian 1995; Rubin 2007). From an ***adverse selection perspective***, Chiang & Venkatesh (1988) use the percentage of holdings by insiders (*IO*) and institutional investors (*INSO*) as a proxy of information asymmetry between insider and outsider's investors and investigated their effect on market liquidity. They find evidence suggesting that a higher percentage of insider holdings lower market liquidity through widening the bid-ask spread. Other studies have also reported a positive relationship between insider holding and trading, suggesting that an increase the insider holding gives higher probabilities of informed trading (Comerton-Forde & Rydge 2006; Heflin & Shaw 2000; Kini & Mian 1995; Rubin 2007). However, institutional shareholders are not been considered informed investors (Brockman et al., 2009; Chiang & Venkatesh 1988; Fehle 2004; Kini & Mian 1995; Rubin 2007). The findings of Rubin (2007) also suggest that as compared to other investors institutional investors trade more and and thus institutional holdings is positively correlated with market liquidity. As a result, this study incorporates both insider and institutional holdings as determinants of market liquidity to equation 3.2, and form the following model:

$$LIQ_{it}=\alpha_0+\beta_1 MV_{it}+\beta_2 VO_{it}+\beta_3 NT_{it}+\beta_4 TZ_{it}+\beta_5 P_{it}+\beta_6 VOL_{it}+\beta_7 IO_{it}+\beta_8 INSO_{it}+\varepsilon_i \quad (3.3)$$

Thereafter, in the 1990s many researchers stated that market liquidity could be affected by ***liquidity-control trade-off*** (Bhide 1993; Bolton & Von Thadden 1998; Coffee 1991; Demsetz & Lehn 1985). For instance, Bhide (1993, p. 31) states that, "*active stockholders who reduce agency cost by providing internal monitoring also reduce market liquidity by creating adverse selection problems"*. Moreover, Bolton & Von Thadden (1998) suggest that in a concentrated ownership structure the number of shareholders who can trade the stock is smaller and, thus, effective market capitalisation is lower, which in turn reduces market liquidity. As a result, a vast body of empirical studies have examined the relationship between ownership concentration (OC) and market liquidity (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010; Naes 2004). As a result, we

add ownership concentration as another determinant of market liquidity to equation 3.3, and form the following model.

$$LIQ_{it} = \alpha_0+\beta_1 IO_{it}+ \beta_2 INSO_{it}+ \beta_3 OC_{it} +\beta_4 MV_{it}+ \beta_5 VO_{it}+ \beta_6 NT_{it}+ \beta_7 TZ_{it}+ \beta_8 P_{it}+ \beta_9 VOL_{it} +\varepsilon_i \ldots\ldots (3.4)$$

However, in order to measure ownership concentration, different studies have used different proxies. For example, some studies have used blockholders as the sole measure of ownership concentration (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010; Kini & Mian 1995). However, most of these studies have found find mixed results on the relationship between bockholders' ownership and market liquidity relationship. As a consequence, other proxies have also been used as measures of ownership concentration besides blockholders in some recent studies. For example, Hartzell & Starks (2003) show that the top five large shareholders (LS) as a proxy of ownership concentration is related to the ability of management to monitor. Large shareholders (LS) measure has an advantage over blockholdings because it is not subject to the arbitrary inclusion cut-off point of 5% share ownership. Rubin (2007) argue that for following the ownership concentration level of a firm over time, LS is better measure of concentration.

To allow for more potential variables in the ownership structure-market liquidity relationship, other studies have suggested the use of different proxies for ownership concentration (see for example, Naes 2004; Jacoby & Zheng 2010; Ginglinger & Hamon 2011). Jacoby & Zheng (2010) suggest that using blockholders as the sole measure of ownership concentration is misleading and leads to biased results and have employed both the number of shareholders and blockholders as the two measures of their definition of ownership concentration. However, it is worth mentioning that different countries have different disclosure requirements and cut-off points for large shareholders. This study therefore uses two different measures as proxies for ownership concentration. The first measure this study uses is blockholders who hold 3% and more of share capital whereas the second measure is the percentage ownership proportion of the top five large shareholders of the sample firms.

According to adverse selection theory, market liquidity decreases when ownership concentration is large, and is dominated by insider holding (Easley & O'Hara 1987; Glosten & Milgrom 1985; Grossman & Stiglitz 1980; Kyle 1985). The majority of the previously published studies on ownership structure literature have linked ownership concentration with market liquidity (see for

example, Brockman et al., 2009; Chiang & Venkatesh 1988; Heflin & Shaw 2000). In addition, as highlighted by Rubin (2007) less attention has been paid to the impact of ownership level on market liquidity in the existing literature. There is also limited published research, which examine the effect of ownership level and concentration on market liquidity. In the existing literature, Heflin & Shaw (2000) and Brockman et al., (2009) focus on blockholders as the sole measure of ownership concentration, whereas, Jacoby & Zhang (2010) consider blockholders and number of shareholders as the two measures for ownership concentration. It can thus be argued, that with the exception of Rubin (2007), which investigates the effect of ownership level and concentration on market liquidity in the US, other previously published studies in this area have only focused on ownership concentration without considering ownership level in their investigations. This study therefore seeks to investigate the effect of both ownership level and concentration on market liquidity in the UK. With the inclusion of both ownership level and concentration to equation 3.4, the following model is formed, which is the benchmark model for the first part of this investigation.

$$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad (3.5)$$

LIQ_{it}	Market liquidity variables: total liquidity costs (proportional bid-ask spread and price impact ratio) and real friction (number of trades, trade size, trading volume and turnover ratio)
IO_{it}	Insider ownership
$INSO_{it}$	Institutional ownership
BKO_{it}	Proportion of aggregate blocks of at least 3% of the firm's outstanding shares held by all outside investors
LS_{it}	Top five largest shareholders of firm's capital
MV_{it}	The natural logarithm of the market value of equity as a proxy for firm size
P_{it}	Price per share

VOL_{it}	Stock price volatility as a proxy for firm risk
IND	A dummy variable for each industry sectors: oil & gas (IND0)… technology (IND9)
YEAR	A dummy variable for each year of the ten years from 2003-2012, 2003(y1), 2004 (y2)… 2012 (y10)
ε_{it}	Unobservable individual-specific effect

At the second stage of its investigation, this study examines the effect of owners' identity on market liquidity. On the one hand, a vast body of research in the insider holding-liquidity pricing literature investigates the ***information hierarchy hypothesis***, which states that trades by insiders who have more information than other shareholders and investors, have a higher price impact ratio. For instance, Jeng et al. (1999) and Fidrmuc et al. (2006) find different markets reactions to the identities of insiders and argue that the trades of executive directors may convey more information than those of non-executive directors because the former are more closely associated with the firm's operations and strategies. In the US, Seyhun (1986) finds support for this hypothesis. However, Fidrmuc et al. (2006) did not find any support for this hypothesis in the UK. As a result, this study seeks to examine whether the executive directors' ownership has a greater effect on market liquidity than that of non-executive director's ownership in the UK capital market. Thus by considering inside ownership (IO) as a determinant of market liquidity, the following equation is formed.

$$IO_{it} = EO_{it} + NEO_{it}$$

Where IO_{it} represents the insider ownership, EO_{it} represents executive director ownership and NEO_{it} represents non-executive directors' ownership. In line with previous literature in this area this study defines inside ownership as the sum of executive and non-executive directors' ownership (see for example, Short & Keasey 1999; Weir et al., 2003; Peasnell et al., 2003; Crespi-Cladera & Renneboog 2003; Fidrmuc et al., 2006).

On the other hand, some recently published studies have examined the role of controlling shareholders' identity on market liquidity. For example, Fehle (2004) argues that the importance of ownership structure is not only in concentrated ownership, but also in its identities. In addition, from both theoretical and empirical perspectives, ownership identity can be categorised as individuals or family, domestic-corporation, foreign investors, financial and non-financial institutions. In this regard, Shleifer & Vishny (1997) argue that different categories of large shareholders may have different monitoring skills and even may have different objectives with respect to corporate strategic decisions. Shleifer & Vishny (1997) also report that although institutional investors play a role in monitoring management, not all institutions are equally willing or able to serve this function, however, monitoring by institutional investors is still considered as an important governance mechanism. Furthermore, both theory and empirical evidence suggest that institutional investors provide active monitoring role relative to smaller, more passive or less informed investors. However, as suggested by Coffee (1991) and Bhide (1993), the intensity of an institution's monitoring can be limited because of its concerns about the liquidity of its portfolios.

Therefore, most previously published studies in this area have studied blockholders' identity on market liquidity by subdividing them into insider and outsider blockholders (see for example, Heflin & Shaw 2000; Rubin 2007; Brockman et al., 2009). The theoretical background of these studies is based on the theoretical work of Demsetz & Lehn (1985), Kole (1995), Morck et al. (1988), and Stulz (1988), which show that blockholders and insiders have access to more private information than outsiders blockholders. Thus in order to avoid the potential substitution problem that may exist between the ownership level and concentration and its identity this study follows previous literature and constructs a separate model for each set of the variables which has been examined in this study (see for example, Brockman et al., 2009; Poon et al., 2013). This separation also helped in making comparisons with the findings of previously published studies in this area (see for example, Brockman et al., 2009; Park 2009; Poon et al., 2013; Rubin 2007). This study therefore first interpret that the outsider ownership as follows.

$$100\% - IO_{it} = OUO_{it}$$

Where IO_{it} stands for insider ownership and OUO_{it} stands for outsider ownership. By following previous literature in this area, this study regard outsider ownership as the sum of controlling shareholders and free float shares available to ordinary shareholders (see for example, Park 2009). In functional form this relationship is interpreted as follows.

$$OUO_{it} = NOSHFF_{it} + NOSHST_{it}$$

Where $NOSHFF_{it}$ stands for the percentage of total shares in issue available to ordinary shareholders, and $NOSHST_{it}$ represents the controlling shareholders.

In addition, this study sub divided controlling shareholders into eight different identities as follows.

$$NOSHST_{it} = NOSHIC_{it} + NOSHOF_{it} + NOSHPF_{it} + NOSHGV_{it} + NOSHEM_{it} + NOSHCO_{it} + NOSHFR_{it} + NOSHOF_{it}$$

All the above-mentioned eight identities are explained below.

In order to examine the impact of owners' identity on market liquidity this study keeps all the above-mentioned identities in context and form the following model. This is the second model used in this study.

$$LIQ_{it} = \alpha_0 + \beta_1 EO_{it} + \beta_2 NEO_{it} + \beta_3 NOHFF_{it} + \beta_4 NOSHIC_{it} + \beta_5 NOSHOF_{it} + \beta_6 NOSHPF_{it} + \beta_7 NOSGV_{it} + \beta_8 NOSHEM_{it} + \beta_9 NOSHCO_{it} + \beta_{10} NOSHFR_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.6)$$

LIQ_{it}	Market liquidity variables: total liquidity costs (proportional bid-ask spread and price impact ratio) and real friction (number of trades, trade size, trading volume and turnover ratio),
EO_{it}	The percentage of ordinary shares outstanding that executive directors hold as recorded at the end of calendar year t,
NEO_{it}	The percentage of ordinary shares outstanding that non-executive directors hold as recorded at the end of calendar year t,
$NOSHFF_{it}$	The percentage of total shares in issue available to ordinary investors,
$NOSHIC_{it}$	The percentage of strategic holdings of 5% or more held as long-term

strategic holdings by investment banks or institutions seeking a long-term return,

$NOSHPF_{it}$ The percentage of strategic holdings of 5% or more held by pension funds or endowment funds,

$NOSHGV_{it}$ The percentage of strategic holdings of 5% or more held by government or government institution,

$NOSHEM_{it}$ The percentage of strategic holdings of 5% or more held by employees or those with a substantial position in a company that provides significant voting power at an annual general meeting (typically family members),

$NOSHCO_{it}$ The percentage of strategic holdings of 5% or more held by one company in another,

$NOSHFR_{it}$ The percentage of strategic holdings of 5% or more held by an institution domiciled in a country other than that of the issuer,

$NOSHOF_{it}$ The percentage of strategic holdings of 5% or more outside of the above strategic shareholder's categories,

MV_{it} The natural logarithm of the market value of equity as a proxy for firm size,

P_{it} Price per share,

VOL_{it} Stock price volatility as a proxy for firm risk,

IND A dummy variable for each industry sector: oil & gas (IND0)… technology (IND9),

YEAR A dummy variable for each year of the ten years from 2003-2012, 2003(y1), 2004 (y2)…… 2012 (y10),

ε_{it} Unobservable individual-specific effect.

Lastly, in the aftermath of the recent financial crisis as ownership concentration was mentioned as one of the causes of the crisis, the importance of the ownership-liquidity relationship has become a heated debate in the literature (Chen & Poon 2007; Chu & Song 2010). In addition, market liquidity has been affected by many market crashes (Amihud et al., 1990). For instance, Amihud & Mendelson (1986) document that during a crisis period a drop in investors' expectations about market liquidity lead to a decline in the stock prices. Recently, Poon et al. (2013) have investigated the effect of institutional trading on market liquidity using the institutional holdings as proxy of institutional trading in the US capital market during the 2007-2008 financial crisis. Their results suggest that the sell-side herding behaviour contributed to the increased trading costs and liquidity risk during the 2007-2008 financial crisis, and confirm the role of trading in exacerbating liquidity shortages during the crisis period. This study therefore, investigates the relationship between ownership level, concentration and owners' identity during the 2007-2009 financial crises in the UK.

3.3 Research Variables Definition and Measurement

This section presents definitions of the dependent, independent and control variables used in this study. The discussion focuses on market liquidity variables, where the dependent variables include, total liquidity costs (proportional bid-ask spread and price impact ratio) and real friction (turnover ratio, number of trades, trading volume and trade size). In addition, it defines the ownership structure and control variables and provides information about the measurements of all the variables used in this study.

3.3.1 Measurement of the Dependent Variables

Market Liquidity

The starting point of understanding market liquidity and its determinants is by analysing what market liquidity means. In the last two decades, academics and researchers alike have gained unwavering interest in the concept of market liquidity because the term "*market liquidity*" is a multidimensional concept. As a result, in this chapter the concept of market liquidity will be defined.

Liquidity Definition

Keynes (1930, p. 67) defines liquidity as "*an asset that is more certainly realisable at short notice without loss*". Although the term market liquidity is common in research and practice there is still no agreement on its measurement, as stated by Kyle (1985), Harris (1990), and Stoll (2000), because of the multidimensionality of the concept. Most of the existing literature gauging liquidity has focused on different dimensions of it. For instance, Kyle (1985) was among the first to identify the dimensions of market liquidity; he suggested three dimension, which are as follows: (1) *Tightness*: the cost of turning around a position over a short period. Generally, the narrower or the smaller the bid-ask spread the more liquid is the market, (2) *Depth of the stock*: is the volume needed to move the prices by a given amount. The larger the volume needed to move the prices, the more liquid is the market. (3) *Resiliency:* is the speed with which prices return to equilibrium or current level following a large trade.

Later, Harris (1990) defined market liquidity as having four dimensions. The first one is *width*, referring to the bid-ask spread for a given number of shares, commissions, and fees to be paid per share. Secondly, a *depth* is the number of shares that can be traded at a given bid and ask prices. The third one, *immediacy*, refers to how quickly trades of a given size can be done at a given cost. The final aspect is *resiliency.* Recently, Stoll (2000) has stated that there are two primary mechanisms on how the level of information asymmetry between insider and outsider investors can affect market liquidity. The first mechanism is called the real friction whereas the second mechanism has been named as the informational friction. The real friction is defined as "*the real resources used up*" in the liquidity provision process. These order processing and inventory costs are highly sensitive to trading activity levels (Benston & Hagerman 1974; Demstez 1968; Tinic 1972 1978a, b). However, informational friction reflects the potential losses of trading against informed traders. In this regard, previous studies have shown that market maker widen bid-ask spread and reduce depths in the presence of informed traders (see for example, Copeland & Galai 1983; Kyle 1985; Glosten & Milgrom 1985). In light of the above discussions I would argue that while measuring market liquidity a number of measures must be taken into consideration because there is no single theoretically correct or universally accepted measure that could determine the degree of stock market liquidity in firms. Keeping all these points in mind this study follows Stoll (2000) and measures stock market liquidity by classifying it into real and information frictions.

Total Market Liquidity Measurement

Proportional Bid-Ask Spread (PBAS)

This measurement captures costs of trading stocks and information frictions in secondary markets; bid-ask spread is one of the most common and frequently used measures of market liquidity. For instance, Demsetz (1968) defines spread as "*the cost of supplying immediacy*". This study uses the daily proportional quoted spread at firm-specific level to calculate the monthly average for each company. More specifically, the firm-specific proportional quoted spread (the quoted bid-ask spread divided by midpoint of quote) for stock i on day d in month t is given by:

$$PBAS_{idt} = \frac{ASK_{idt} - BID_{idt}}{(ASK_{idt} - BID_{idt})/2}$$

$$BAS_{idt} = ASK_{idt} - BID_{idt}$$

Price Impact Ratio (PIMPACT)

The price impact ratio is the impact of order flows on prices. For example, when buy or sell orders arrive at the market with specific quantities, any imbalance in orders will move prices up or down because such an imbalance could be the result of an information asymmetry, and the orders will be executed at a higher or a lower price. For instance, Kyle (1985) developed a model where market makers are unable to differentiate between informed and uninformed traders (i.e. liquidity traders) and therefore choose to set prices that are an increasing function of the probability of trading with informed traders. The price impact ratio (known as Kyle's lambda) is used as a proxy for information asymmetry in order to capture the depth dimension of a stock's market liquidity – the market's ability to absorb and execute large orders with a lower price impact ratio. Therefore, this study uses the Amihud (2002) illiquidity ratio as a proxy for the price impact ratio. This measure is first calculated for each stock in the sample; that is, the price impact ratio for stock i at day t is given as follows:

$$PIMPACT_{\ idt} = \frac{|Ri|_{\ idt}}{T\ value_{\ idt}}$$

Where:

R_{it} is the return for stock i at day t and $TValue_{it}$ is the trading value for stock i at day t.

Real Friction Measurement

Trading Volume and Turnover Ratio

Trading volume is traditionally used to measure the existence of numerous market participants and transactions. However, trading volume can be given more meaning by relating it to the outstanding volume that results in turnover rate. This study uses the turnover ratio for each stock in the study's sample; turnover ratio is given as ratio of trading value to firm's capitalisation. It is one of the trading activity measures that are frequently used as a proxy for real friction of market liquidity, as it is highly associated with bid-ask spread and other measures of liquidity. With regard to trading volume, previous studies have documented that high trading volume reflects a lack of compromise, which in turn increases the demand for information. In addition to that, firms with higher trading volume present market makers with more opportunities to manage their inventory and recapture losses to informed investors. In other words, the higher the trading volume in a stock, the higher would be the absorptive capacity of the market and the lower would be the impact cost (McInish & Wood 1992).

More specifically, this study calculates the firm-specific turnover ratio as the ratio of trading values to a firm's market capitalisation for stock i on day d in month t, which is given by:

$$TR_{idt} = \frac{VO_{idt}}{MV_{idt}}$$

Where TR is the turnover ratio for stock i on day din month t, which is calculated as trading volume multiplied by the stock price, which is the market capitalisation for stock i on day d in month t.

Trade Size and Number of Trades

Stoll (2000) documents that the cross-sectional relationship between market liquidity and trading characteristics as initially suggested by Demsetz (1968), who provides a set of standard determinants of liquidity such as trade size and number of trades. From an inventory perspective, trading activity measured by trade size and number of trades should be positively related to market

liquidity, as an increase in trading activity allows the market maker to reduce his/her inventory risk. Along these lines, Tinic (1972) and Benston & Hagerman (1974) provide empirical evidence for the positive relationship between trading activity and market liquidity. Furthermore, from an information asymmetry perspective, these relationships will also hold. For instance, Copeland & Galai (1983) provide a theoretical foundation for the negative relationship between bid-ask spread and trading volume and McInish & Wood (1992) find that measures of trading activity (number of trades and trade size) are negatively related to quoted bid-ask spread.

Moreover, Cao et al. (2004) distinguish between changes in the firm's trading activity (i.e., volume, number of trades, and average trade size) and changes in the firm's bid-ask spread. They show that lockup expirations are associated with a significant increase in the firm's trading activity but little if any change in bid-ask spread. The implication is that any increase in the firm's informational friction is offset by a decrease in the firm's real friction. This study measures the firm-specific turnover ratio as the ratio of trading value to a firm's market capitalisation for stock i on day d in month t, which is given by:

$$TZ_{idt} = \frac{VO_{idt}}{NT_{idt}}$$

Where the trade size is for stock i on day d in month t, which is calculated as trading volume for stock i on day d in month t divided by the number of trades for stock i on day d in month t.

3.3.2 Key Explanatory Variables

This study aims to examine the effect of ownership structure on market liquidity. In particular, the first objective of this study is to examine the effect of ownership level and concentration on market liquidity. The second objective of this study is to indicate the effect of owners' identity on market liquidity. In other words, do different owners' identities affect market liquidity differently? The definitions and measurements of these variables are provided in this section.

Insider Ownership*: This* is measured as the sum of executive and non-executive directors (De Cesari & Ozkan 2014; Korczak & Liu 2013; Ozkan 2007; Short & Keasey 1999). For example, Fidrmuc et al. (2006, p.3) define insiders as "*member of board of directors of publicly traded corporations that usually possess more information about their company than do (small) outside*

shareholders"**.** Therefore, this variable is extracted from the BoardEx database since this database provides the number of shares held by executive and non-executive directors on UK boards.

Non-executive Ownership*:* This variable is measured as the number of shares held by non-executive directors. The measurement of this variable is in line with recent UK studies (Davies et al., 2005; Florackis & Ozkan 2009). In the UK, non-executive directors are employed as part-time directors (Guest 2008). This definition is in line with the BoardEx database definition, which states, "*the number of shares held directly by non-executive directors and multiplies by the stock price of the organisation at the Report Date selected*".

Executive Ownership*:* This variable is measured as the number of shares held by executive directors. The measurement of this variable is in line with recent UK studies (Davies et al., 2005; Florackis & Ozkan 2009). In the UK, executive directors are employed as full-time directors. This definition is in line with the BoardEx database definition, which states, "*the number of shares held directly by executive directors and multiplies by the stock price of the organisation at the Report Date selected*".

Institutional Ownership*:* Evidence in the extant academic literature on institutional investment highlights the importance of the effect of institutional ownership on market liquidity (Agarwal 2007; Cao & Petrasek 2012; Dennis & Weston 2001; Sarin et al., 2000). This study follows the extant literature in the UK and defines institutional ownership as the ratio of the number of shares held by institutional investors to the total number of shares outstanding (Fernandes et al., 2013; Ozkan 2007).

Blockholders*:* Blockholders are measured as the sum of the stakes of a firm's shareholders with equity ownership greater than 3% (Florackis & Ozkan 2009; Goergen & Renneboog 2008; Khurshed et al., 2011). For example, Khurshed et al. (2011) state that in the UK, only those investors who own at least 3% of the total shareholding are disclosed in their investee firm's financial statements.

Large Shareholders: This is measured as the top five large shareholders. Hartzell & Starks (2003) show that this measure is related to the ability of management to monitor. Even though institutional blockholdings are more commonly used, one advantage of the large shareholders measure is that it is not subject to the arbitrary inclusion cut-off point of 5%. Thus, the large shareholders measure is

a finer measure of concentration if one wants to follow the concentration level of a given firm over time (Ozkan 2007).

However, by following Park (2009), this study measures the identity of controlled shareholders and ordinary investors as follows:

Pension Fund Ownership is measured as pension owners who hold 5% and more of number of shares outstanding at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year.

Employee Ownership is measured as employee blockholders for stock i in year t, which is calculated as employee owners who hold 5% and more of number of shares outstanding at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year.

Cross-Holding Ownership is measured as cross blockholders for stock i in year t, which is calculated as cross owners who hold 5% and more of number of shares outstanding by one company in another at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year.

Foreign Ownership is measured as foreign blockholders for stock i in year t, which is calculated as foreign owners who hold 5% and more of number of shares outstanding at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year.

Investment Banks' Ownership is measured as investment bank blockholders for stock i in year t, which is calculated as investment bank owners who hold 5% and more of number of shares outstanding at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year.

Government Ownership is measured as government blockholders for stock i in year t, which is calculated as government owners who hold 5% and more of number of shares outstanding at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year.

Free Float Ownership is measured as free float ownership for stock i in year t, which is calculated as free float owners at the end of the fiscal year for stock i in year t over the number of shares outstanding (WC05301) in the same year. This study measures the free float ownership as:

$$Float\% = \frac{number\ of\ shares\ outstanding - insider\ ownership}{number\ of\ shares\ outstanding}$$

Control Variables

The following section provides the definition and measurement of the control variables that are part of the estimations and are included in the empirical models. Each variable has been regarded as an an important determinant of market liquidity. In addition, the measurements and definition of variables used in this study are based on theoretical as well as empirical evidence available in this area of research.

Price Volatility

A considerable amount of the previous literature indicates a positive relationship between the volatility of share price and market liquidity (Benston & Hagerman 1974; Copeland & Galai 1983; Mclnish & Wood 1992; Stoll 1978; Tinic & West 1972). Moreover, Bhushan (1989) and Moyer et al. (1989) suggest that private information is more valuable for firms with higher price variability. The more volatile a firm's price is, the more uncertain the market maker is of the short-term cost of holding the stock. To protect against price swings, the market maker will increase the spread. Prior studies have confirmed this idea with evidence of a positive relationship between price variance and the spread (Jegadeesh & Subrahmanyam 1993; Stoll 1978). In this study and consistent with previous studies, volatility of share price is measured as standard deviation of daily returns.

Share Price

The firm's stock price is mechanically associated with percentage of bid-ask spread. In addition, stocks with low prices face higher than usual bid-ask spread because of discreteness in tick sizes (Jegadeesh & Subrahmanyam 1993; Welker 1995). Stoll (1978) suggests that the minimum allowable of bid-ask spread of £1/8 can cause low-priced stocks to have artificially high bid-ask spread. On the other hand, Brennan & Hughes (1991) state that the level of the stock price is related to a firm's market liquidity, since it controls for price discreteness and also acts as a proxy for firm

risk; that is, low prices are associated with higher risk (Stoll 2000). Thus, this study measures the annual stock price using the average of the daily closing prices.

Firm Size

Firm size has been identified as an important measure in previous literature. In this regard, Anderson & Fraser (2000).suggest that due to their access to capital markets, larger firms are expected to have higher market liquidity. Additionally, larger firms, on average, release more information than smaller firms release and had more analyst following and are thus subject to more scrutiny by the investment community than smaller firms (Brennan & Subrahmanyam 1995). By following previous literature, this study measures firm size by market capitalisation defined as the total number of shares outstanding multiplied by price at the end of each day (Brockman et al., 2009; Chiang & Venkatesh 1988; Heflin & Shaw 2000; Jacoby & Zheng 2010; Kini & Mian 1995).

3.4 Sample Selection and Data Collection Criteria

The sample consists of all FTSE All-Share stocks traded on the London Stock Exchange (LSE) for the period from December 2002 until December 2012, obtained from the Datastream database. The sample includes both active and dead (delisted) stocks, avoiding any survivorship bias; actives stocks are those that were still being traded until December 2012, while the delisted stocks are those that happened to be traded sometime between 2003 and 2012 and then delisted. Moreover, this study excludes financial institutions, insurance companies, unit trusts and ADRs because their ownership structure and market liquidity measurement are fundamentally different and they are by no means comparable with the other firms. The final number of non-financial firms that is available for analysis before applying any more criteria is 547. However, this study imposes several screening criteria to our dataset before conducting our empirical tests, following other UK-based studies such as Crespi-Cladera & Renneboog (2003), Mura (2007) and Florackis & Ozkan (2009). This study excludes firms with market value less than £10 million. Moreover, this study excludes firms with missing data for either of the study's major variables (market liquidity and ownership structure). Lastly, this study ignores observations of each variable that fall outside the 1st and 99th percentile range.

The analysis of this study is based on a dataset that combines information from different sources; specifically, our data include detailed information on ownership structure and market variables, such as bid and ask prices, market capitalisation, close prices, trading volume, number of trades,

number of shares outstanding, free float shares, and industry classification. In particular, market and accounting data are obtained from Thomson Datastream and Worldscope respectively. Ownership structure data has been extracted from different sources, for instance, insider ownership was extracted from the BoardEx database, whereas data regarding institutional ownership and the percentage of shares held by blockholders who hold 3% threshold are hand collected from UK firms annual reports provided by the Northcote website[6]. Finally, this study matches BoardEx and annual reports data with market and accounting data from Thomson Datastream and Worldscope. The study however, excludes observations where valid data was available from Datastream and Worldscope, but where the required matching data was not available from BoardEx database or where annual reports were not available from the Northcote website.

Table 3.1 Sample Firm Industry Classification

Main Industry	Industry Code	Number of Firms	Percentage from Final Sample
Basic Material	IN1	20	8.85%
Consumer Goods	IN2	26	11.50%
Consumer Services	IN3	57	25.22%
Health Care	IN4	11	4.867%
Industrials	IN5	68	30.08%
Oil and Gas	IN6	14	6.194%
Technology	IN7	17	7.522%
Telecommunication	IN8	7	3.097%
Utilities	IN9	6	2.654%
Total		226	100%

3.5 Econometric Issues

3.5.1 Heteroscedasticity

There is evidence in the existing literature, which highlights that panel data is useful for mitigating the heteroscedasticity problem (Baltagi 2005; Psillaki & Daskalakis 2009; Wooldridge 2002). However, panel data also poses several estimation problems; for example, it is a two-dimensional data, i.e., they have both cross-sectional and time series dimensions. Therefore, panel data may still

[6] http://www.northcote.co.uk/.

suffer from problems such as heteroscedasticity and serial correlation. If these problems are not properly addressed in the analysis process then the conclusions drawn may be misleading because the presence of heteroscedasticity result in biased estimates of standard error and the resulting 't' and 'f' statistics would be misleading (Gujarati 2003). The heteroscedasticity problems usually arise because the sample usually includes both sizes (small and large) of firms. As this study's sample includes firms of different sizes, therefore, its estimation results may be biased because of a heteroscedasticity problem. Hence, an important question is how to mitigate this problem.

There are several methods suggested in the literature for dealing with the heteroscedasticity problem. One commonly used method is deflation of data by some measure of size (Maddala 1992). In this method, both dependent and independent variables are deflated by some measure (e.g., size, book value, market value, number of shares). The purpose of deflation is to control for the size or scale effect. Thus, both dependent and independent variables in this study are scaled by the market value of equity in order to control for the scale effect and to mitigate the heteroscedasticity problem (Brav 2009). Furthermore, the study also uses White's (1980) heteroscedasticity-consistent variances and standard errors for mitigating the heteroscedasticity problem.

3.5.2 Serial correlation

As mentioned above, panel data may suffer from problems such as heteroscedasticity and serial correlation. Serial correlation is defined as "*Correlation between members of series of observations ordered in time {as in time series data} or space {as in cross-sectional data}*" (Gujarati 2003, p. 442). The presence of serial correlation affects the estimation results. As a consequence, the results from estimation may be misleading (Wooldridge 2002). Moreover, in the presence of serial correlation the 't', 'f', and 'χ^2' statistics give incorrect results (Gujarati 2003). The problem of heteroscedasticity and serial correlation is common in ownership structure-liquidity studies (Heflin & Shaw 2000; Poon et al., 2013). In order to deal with this problem, this study computes standard error that is robust to both heteroscedasticity and serial correlation using the option "Robust" in STATA 11.

3.5.3 Multicollinearity

Multicollinearity is another important econometric issue that researchers need to tackle consider when estimating the multiple regression model. According to Gujarati (2003, p. 443), this problem

refers to "*the existence of a ''perfect'' or exact linear relationship among some or all explanatory variables of a regression models*". The existence of correlation makes it difficult to estimate the regression model precisely. To put it another way, if there is high correlation between independent variables, then interpretation of the regression coefficients would be very difficult. Other symptoms of multicollinearity are the larger value of standard error, low value of t-statistics and the very high value of goodness of fit, R^2, etc. Furthermore, it is crucial to take into account this problem while analysing data. When multicollinearity exists, it means that there is intercorrelation among the predictors of the model, which makes the coefficient unreliable, and results in the impossibility of determining the relative importance of the independent variables because of inflation in the standard errors.

As a consequence, two well-known techniques are employed in order to detect the problem of multicollinearity in this study. First, there is the variance inflation factors (VIF) test, where the tolerance factor and variance inflation factor of each ownership level, concentration and owners' identity and control variables are computed. The existence of multicollinearity in the model can be become evident in circumstances when the tolerance factor is close to zero and value of the variance inflation factor is more than 10. Second, there is the Spearman rank correlation, which requires that for showing that there is no problem of multicollinearity in data all the correlations between pairs of variables should be less than 0.80. As a result, both the VIF test and the Spearman rank correlation tests were performed which confirm that no intercorrelation among the study's independent variables, in investigating the relationship between ownership level, concentration, owners' identity and market liquidity, explained in Chapter 4 and 5.

3.5.4 Missing Data

With regard to missing data, due to a few cases of missing the insider ownership data and poor disclosure and practices in other ownership variables (i.e. blockholders), the data used in this study contain some missing values. In order to mitigate this problem, other data sources were utilised to fill the gaps. However, it was decided not to delete or impute the observations that contained missing values, for the following reasons: firstly, the missing data removal strategy would negatively affect the population by decreasing the sample size and might cause a change in the content of the information. Secondly, it was chosen to retain the missing values, as STATA 11 software used for analysing the data, would drop them automatically. Nevertheless, researchers should be concerned about the retention of missing data, which can lead to unbalanced data.

However, the problem of the unbalanced nature of panel data can be overcome by using appropriate estimation methods that also deal with the problem of heteroscedasticity (e.g., random-effects or fixed-effects regression and robust regressions such as cluster standard error and Huber-White sandwich). I would thus, argue that the choice of estimation method, controlling the problem of missing data and tackling of other econometric issues, are the important elements in this examination, which has helped in the provision of robust and consistent conclusions.

3.5.5 Outliers

The issue of dealing with with outliers, typically known as extreme values, is another econometric problem that may lead to a bias in the estimation parameters and reduce the significance of the statistical model (Gujarati 2004). The existing literature indicates different ways to deal with this issue. For example, one of the common procedures is removal. However, this solution may increase the missing data and therefore affect the results of the regression analysis. Another common way to deal with outliers is Winsorisation. In this treatment all the values above and below a certain point are substituted with a value calculated according to the upper and lower percentiles. Consistent with previous UK studies in this area (such as De Cesari & Ozkan 2013; Florackis & Ozkan 2009; Ozkan 2007), this study removes the top and bottom 1% of all variables to mitigate the influence of outliers.

3.5.6 Endogeneity

In the existing literature on the ownership structure and market liquidity relationship different studies regard the endogeneity issue as the most important concern (see for example, Poon et al., 2013; Rubin 2007). However, most of the existing literature in the ownership structure area fails to deal with this problem properly (Chiang & Venkatesh 1988; Kini & Mian 1995; Sarin et al., 2000; Heflin & Shaw 2000; Brockman et al., 2009; Jacoby & Zheng 2010). As highlighted by Poon et al., (2013) and Rubin (2007) the endogeneity problem mainly arises from two sources: ***simultaneity*** and ***unobservable heterogeneity***. On the one hand, simultaneity arises when the dependent variable and one or more of the explanatory ones are determined in equilibrium; in this case, the first variable causes the other(s), and the reverse is true (Roberts & Whited 2012). According to Gujarati (2004, p. 753-754), "*simultaneity problem arises because some of the regressor are endogenous and are therefore likely to be correlated with the disturbance, or error term*".

On the other hand, unobservable heterogeneity, also known as omitted variables, occurs when the relationship between two or more variables in the regression model is influenced by another variable but is unobservable (Poon et al., 2013). The problem here is that these omitted variables appear in the error term in the regression model instead of being with the independent variables. If there is a correlation between these omitted variables and other variables in the model, in this case we are dealing with an endogeneity problem in our regression model as stated by Hsiao (2003). In the ownership structure-liquidity relationship, firm-specific characteristics – also known as firm-fixed effects – could influence ownership structure variables, but are unobservable and difficult to measure. As mentioned previously, the choice of estimation method and controlling the problem of endogeneity are the two most important elements in this examination, which has helped in the provision of robust and more accurate conclusions.

3.6 Analytical Procedures

This section presents the analytical strategies that will be used in Chapter 4, 5 and 6. In the first place, this section introduces the nature of data employed in the study, i.e., panel data. Additionally, the pros and cons of using panel data are also discussed and explained. More importantly, this section provides a detailed explanation of the panel data. The unique characteristics and features of this estimation method are also highlighted. However, to deliver a clear picture of the estimation method it is important to explain the endogeneity problem since it is the main concern in this study as mentioned in the above section.

The statistical methods utilised in this study are mentioned in this section. Generally, these methods are classified into two main categories, parametric and non-parametric estimations, and the decision as to which method should be employed depends on the nature and characteristics of the data. According to Gujarati (2003) there are four assumptions that should be met before using parametric tests, namely: the assumptions of normality, linearity, homoscedasticity and independence of error terms. Generally, parametric tests are more proper and can generate estimates that are more accurate if all these assumption are met, and when all variables that are used in the analysis are measured on at least an interval scale (see for example, Judge et al., 1985).

Nevertheless, if one or more of these assumptions is violated or is inaccurate, parametric methods can be a misleading approach and using non-parametric tests may be more effective (Balian 1982; Greene 2008). These assumptions are explained as follows: (1) *Normality*, this conjecture requires

that the sample data must be normally distributed. Two common tests or checks are used to examine the normality of the variables of this study, namely: skewness and kurtosis. According to Haniffa & Hudaib (2006), statistically, data is considered to be normally distributed if the skewness value is ±1.96 and the kurtosis value is within ± 3. (2) *Linearity*, this conjecture entails that the model should have linear parameters. In other words, the relationship between the explanatory variables (X) and the dependent variable (Y) should be linear. In circumstances where this assumption is violated the using parameter methods will result in biased estimates (Ayyangar 2007). (3) *Homoscedasticity*, under this conjecture, the standard deviation or the variance of the dependent variable within the groups is needed to be equal or homogenous. If not, the problem of heteroscedasticity will occur, which leads to biased standard errors and inefficient estimates. (4) *Independence of error terms*, this conjecture comprises that the error terms must be independent from each other, and thus no serial correlation must exist. In other words, parameter models demand that the error terms are uncorrelated and thus the observations are uncorrelated. If not, there is an autocorrelation.

As this study's sample includes firms of different sizes, therefore, its estimation results may be because of a heteroscedasticity problem. Hence, an important question is how to mitigate these issues. There are several methods suggested in the literature for treating the heteroscedasticity problem. One commonly used one is deflation of data by some measure of size (Maddala 1992). In this method both dependent and independent variables are deflated by size. The purpose of deflation is to control for the size or scale effect. All variables used in this study are scaled by market capitalisation in order to control for the scale effect and to mitigate the heteroscedasticity problem (Brav 2009; Carpenter et al., 1994). The various checks that were discussed above were made to examine the data of this study against the assumptions of the OLS regression model. However, the results of the tests illustrate that the data do meet the required criteria or conditions for the parametric tests, and show that using parametric methods is an acceptable approach with regard to estimating the models created in this study due to the nature and characteristics of the data. The results for skewness and kurtosis (as will be demonstrated in the fourth and fifth chapters) indicate that most of the variables are normally distributed.

However, other checks have been applied to confirm these findings. Although the Shapiro-Wilk test provides some evidence that the data are normally distributed (i.e. values are significantly less than 1), the Kolmogorv-Smirnov test and the Quantiles plot confirm that the assumption of normality is not met. With respect to the assumption of homoscedasticity, the widely used Breusch-

Pagan and White tests were employed to detect the problem of heteroscedasticity. The findings of both tests illustrate that the problem of heteroscedasticity exists. Finally, the Durbin-Watson test was used in this study since it is the most common technique that is employed to detect the problem of autocorrelation. The results of this test showed that the assumption of independence of the error terms was not met.

Along with other assumptions, the normality of error terms is demanded for the statistical tests to be valid (Ayyangar 2007). In particular, OLS estimators become inefficient if the normality of the model is violated (Greene 2008). Hence, the estimated standard errors will be biased and inconsistent (Baltagi 2001; Greene 2008). It is suggested that two alternative statistical solutions can be used to overcome the problem of non-normality: firstly, transforming the data to adjust to parametric procedures by normalising it artificially or, secondly, employing other estimation methods that are robust and deal with the non-normality of variables (Dinga 2011).

Statistically, it is suggested that data transformation helps in overcoming the problem of non-normality and outliers by artificially making the data normally distributed. Although this technique could affect the output of the analysis by changing the fundamental nature of the information that results in complicating any interpretation (Osborne 2005), it has been found that using this technique for improving the normality of data is a valuable statistical method. Therefore, consistent with previous studies in ownership-liquidity relationship (Brockman et al., 2009; Heflin & Shaw 2000), this study uses the natural logarithm of all the study's variables. Moreover, in order to check the consistency of the results, it was decided to utilise some appropriate estimation methods for non-normally distributed variables (e.g. robust regressions; cluster and Huber-White sandwich).

The most common of these alternative robust estimators is the Huber-White sandwich estimation, which was developed by Huber (1967), Eicker (1967) and White (1980). This robust approach produces robust standard errors that can deal with some violations of identity of variances, and thus standard errors that are attained by this approach are consistent, even if the residuals are not homogenous. Arellano (1987) expanded the Huber-White work and projected a cluster-robust estimator to diminish the conjecture of independently distributed residuals and therefore control for autocorrelation together with dealing with the problem of heteroscedasticity (Hoechle 2007). Clustering robust estimation is a robust approach that allows for the violation of independent errors or residual assumptions. This approach creates consistent standard errors if the residuals are correlated within the groups (Greene 2007; Hoechle 2007). Furthermore, in panel analyses, where

cross-section individuals are followed over time, the cluster robust estimation is appropriate since it corrects for the heteroscedasticity problem in the cross section and other general forms of serial correlation over time (Vogelsang 2008). As a consequences, clustering robust estimation is used in the primary analysis of this study since it accounts for the problems of autocorrelation and heteroscedasticity.

3.7 Methods of Estimation

The previous section discussed the main econometric problems that may arise in the dataset. However, controlling for endogeneity in the empirical model is considered to be the main challenge in this study. The traditional estimation methods fail to control for the two types of endogeneity problems were discussed in previous sections. Before explaining how this study controls for these issues, the limitations of the most popular estimation techniques in the literature, i.e., OLS and the use of Fixed Effects Models, which are discussed below.

Standard OLS Regression

The OLS method of estimation is very popular and common in linking cause and effect in a regression model. However, in order for the OLS to be the best choice in the estimation, the errors in the model should have the same variance, or what is technically called homoscedasticity, and also be independent from each other (Podesta 2002). The situation in most of the dataset is not the case; when OLS is related to panel data, in most cases it provides biased and inconsistent results. For instance, Hicks (1994, p. 171-174) states, "*the errors from the pooled data regression tend to be complicated and therefore violate the general assumption of OLS*".

As stated by Hicks (1994), the violations of the OLS assumptions may result from the following reasons. First, errors might be serially correlated, in which they are not independent from one period to another. This may happen because of the interdependence of the observations that illustrate them across time. Therefore, the errors from pooled regressions are labelled as autocorrelated. Second, errors tend to be heteroscedastic, which means they may have differing variance across ranges or subsets of nations (Hicks 1994, p. 172). Third, errors might be non-random across spatial and/or temporal units, because parameters are heterogonous across subsets of units (Hicks 1994). As consequences, and because of the mentioned complexity in the errors from the standard OLS data, I can say that applying OLS is not a valid method in this study.

Fixed-Effect vs. Random-Effect Regression

The fixed-effect model is a technique that estimates the fixed effect of predictors on the dependent variables by controlling for the constant variations arising from the omitted variables and for unobserved heterogeneity between groups over time. The assumption of this approach is that the individual-specific effect is related to the regressors. The fixed-effect approach works by removing much of the error variance that arises due to the misrepresentations resulting from the individual differences between groups that come from the omitted variables or the unobserved heterogeneity that is correlated with the regressors. Nevertheless, this approach permits for correlations between the unobserved individual effects with the model's variables (Greene 2008). That is, problems of autocorrelation or heteroscedasticity that affect estimation arise from time or group-specific variations and cannot be handled using the fixed- effect model.

However, random-effect models assume no individual or fixed effects, and thus consider the individual-specific constant terms as being randomly distributed within or between the cross-sectional groups (Greene 2003). Judge et al. (1985) propose that the statistical assumption is dependent on the observed cross-sectional units in the sample. For instance, when there are a large number of cross-sectional units and the amount of time series data is small, random-effect models have been recommended. Moreover, Greene (2003) documents that the fixed-effect models cannot be generalised outside the sample under consideration, and it may only be fitting to use this technique in cross-sectional examinations. Moreover, he anticipated that the individual-specific constant terms must be seen as randomly distributed across cross-sectional firms if the sample is collected from a large population. Thus, as this study is drawn from a relatively large population, the FTSE All-Share Index, and has a large number of cross-sectional units and covers ten years of time series, this means that the above viewpoints may utilise and thus it is likely to be more accurate to use the random-effect approach. Nevertheless, in order to justify this choice statistically, research in economics usually employs the Hausman test (McKnight & Weir 2009).

As a consequence, the Hausman test (1978) is used to statistically make the choice between fixed- and random-effect models. The main aim of this common test is to check for severe exogeneity, and it works by simplifying the differentiation between these two techniques by investigating for correlations between the independent variables and the individual random effects. The results of this test can be interpreted as follows. If the correlation between X variables and εi is found to be:

1) Significant or less than 0.05, then the fixed-effect approach is selected.
2) Insignificant or more than 0.05, then the random-effect approach is selected.

Therefore, under the Hausman model specification test, the assumptions for the choice of (1) the fixed-effect approach is that the X variables must be significantly correlated, to the unobserved heterogeneity, and (2) the random-effect approach is that the X variables must be insignificantly correlated to the unobserved heterogeneity. The Hausman (1978) test results for examining the effect of ownership level and concentration on market liquidity and the effect of owners' identity on market liquidity, are respectively as follows; prob<chi2= 0.8587 and prob<chi2= 0.7458. As a result, this study employs fixed effect models over and above the random effects models of estimation.

Pooled OLS regression with year and industry Dummies

The pooled OLS regression is also called pooled time-series and cross-sectional regression. In this regression all the cross-section data are pooled into one large cross-section data, which is called panel data, and the standard OLS regression is used to estimate this pooled data. One reason to pool data is to increase the sample size. However, using pooled OLS does not solve the omitted variables problem. Omitted variables are variables that are not in a model or an analysis that influences both the cause and effect and so may cause bias (Shadish et al., 2002). Because of the time series dimension, a different time intercept is allowed. Using time dummy variables can allow the intercept to differ across periods. Dummy variables are variables that take on the value 0 or 1 to indicate the absence or presence of some categorical effect that may be expected to shift the outcome (Wooldridge 2002, p. 225).

Furthermore, following most of the prior ownership structure studies, 10 dummies are included to control for years in this study (Poon et al., 2013). Given the possibility that the variables of this study may change over the period of the study, therefore including year dummies will control for the trends of ownership structure variables (Poon et al., 2013). In addition, the time span of the study covers the recent financial crisis. To capture this effect, this study includes a dummy variable for each year in the study's period. These dummies take a value of between 1 and 10 for each year from 2003 to 2012. (For example, Y1 stands for the year 2003; Y2 stands for the year 2004, etc. up to Y10).

Moreover, industry dummies are included to stand for industry-specific factors that affect the determinants of market liquidity (Poon et al., 2013). The level of ownership concentration may differ across industries (Bebchuk & Roe 1999; Chu & Song 2010). For instance, Chu & Song (2010) state that highly concentrated industries have a higher information asymmetry between insiders and outsiders, which leads to a decrease in market liquidity. Moreover, a highly concentrated industry can increase costs of transaction (Bebchuk & Roe 1999). Using the Industry Classification (ICB) (FTSE Factsheet 2008), this study classifies non-financial sectors into different industries. For instance, this study employs nine dummies for the non-financial sector as follows: IN1 relates to "Oil & Gas", IN2 "Basic Material", IN3 "Industrials", IN4 "Consumer Goods", IN5 "Health Care", IN6 "Consumer Services", IN7 "Telecommunication", IN8 "Utilities", and IN9 "Technology". More importantly, Poon et al. (2013) argue that controlling for industry-fixed effect mitigates the endogeneity concern.

In summary, this study employs pooled OLS regression with year and industry dummies as the main estimation method for the empirical models. The limitations in the traditional analysis technique especially in dealing with the endogeneity concern justify using OLS dummies to provide valid and consistent results. Further, the software package that is used in data analysis is "STATA 11", which is considered to be an advanced statistical program that provides a variety of analysis test options to check and analyse the data.

3.8 Summary

This chapter has described the data and research methods used in this research. The data for this study was collected from different sources; for example, market and accounting data was extracted from Datastream and Worldscope databases, whereas ownership data was collected from the BoardEx database and the annual reports of UK companies. The criteria for constructing the study sample is also explained for non-financial FTSE All-Share Index. The sample covers all publicly listed companies in the FTSE All-Share Index, over the period 2003-2012. Moreover, complete descriptions for the variable measurements used in the empirical models have been identified and explained. Further, this chapter has provided descriptions of two models where the first model estimate the effect of ownership level, concentration and market liquidity and the second model, measures the effect of owners' identity on market liquidity. The chapter also contains detailed

discussions on the chosen research methodology and related econometric issues. The next chapter investigates the relationship between ownership level and concentration on market liquidity.

Table 3.2 Ownership Level, Concentration, Owners' Identity and Market Liquidity, Control Variables and their Description

Variable name (code)	Descriptions	Source of data
Stock Market Liquidity: Dependent Variable (LIQ)		
Bid (PB)	The highest price for a stock in a particular day at which the market maker (i.e. dealer) is willing to buy	Datastream
Ask (PA)	The lowest price for a stock in a particular day at which the market maker (i.e. dealer) is willing to sell	Datastream
Proportional Bid-Ask Spread (PBAS)	(PA-PB)/ (PA+PB)/2	Own calculation
Trading Volume (VO)	The total value of shares traded for a stock on a particular day in pounds sterling adjusted for capital action (stock split)	Datastream
Turnover Ratio (TR)	The number of times that shares are traded for a stock on a particular day, calculated by dividing stock trading volume (VO) by the number of shares outstanding (WC05301)	Own calculation
Price Impact Ratio (Pimpact)	Absolute (RI) divided by the trading volume (VO)	Own calculation
Number of Trades (NT)	This is the total number of transactions that were traded for a specific stock in a particular day	Datastream
Trade Size (TZ)	The average number of shares traded in a single transaction for a stock on a particular day, calculated by dividing stock trading volume (VO) by the number of trades (NT)	Own calculation
Independent Variables: Ownership Structure (OS)		
Insider ownership (IO)	The sum of shares held by executives and non-executives as a percentage from the number of shares outstanding	BoardEx
Institutional ownership (INSO)	The percentage of total shares in an issue available to ordinary investors	Annual report
Blockholders (BOK)	The proportional of aggregate blocks of at least 3% of the firm's outstanding shares held by all institutional investors	BoardEx
Large shareholder (LS)	Top five largest shareholders	Annual report
Executive ownership (EO)	The percentage of ordinary shares outstanding that executive directors hold as recorded at the end of calendar year t	BoardEx
Non-Executive ownership (NEO)	The percentage of ordinary shares outstanding that non-executive directors hold as recorded at the end of calendar year t	BoardEx

Government ownership (NOSHGV)	The percentage of strategic holding of 5% or more held by government or government institution	Datastream
Cross ownership (NOSHCO)	The percentage of strategic holding of 5% or more held by one company in another	Datastream
Pension fund ownership (NOSHPF)	The percentage of strategic holdings of 5% or more held by pension funds or endowment funds	Datastream
Investment Company ownership (NOSHIC)	The percentage of strategic holding of 5% or more held as long-term strategic holdings by investment banks or institutions seeking a long-term return	Datastream
Employee ownership (NOSHEM)	The percentage of strategic holding of 5% or more held by employees or those with a substantial position in a company that provides significant voting power at an annual general meeting (typically family members)	Datastream
Other ownership (NOSHOF)	The percentage of strategic holdings of 5% or more outside of the above categories	Datastream
Foreign ownership (NOSHFR)	The percentage of strategic holding of 5% or more held by an institution domiciled in a country other than that of the issuer	Datastream
Control Variables		
Rate of Return (RI)	This shows a theoretical growth in value of a share-holding over a specified period, assuming that dividends are re-invested to purchase additional units of equity	Datastream
Market Value of Equity (MV)	Is measured as the share price on a specific date multiplied by the number of ordinary shares in an issue adjusted for capital action changes (stock split and dividend) (P * WC05301)	Datastream
Share Price (P)	Represents the official closing price expressed in pence	Datastream

Chapter 4

Ownership Level and Concentration and Its Impact on Market Liquidity

4.1 Introduction

The last two decades have witnessed considerable attention has been paid by academics, practitioners and regulatory bodies to the market liquidity-ownership relationship. The ownership structure is considered to be one of the most important determinants of market liquidity. For instance, a large body of literature indicates that ownership structure in terms of insider ownership effect market liquidity (Chiang & Venkatesh 1988; Comerton-Forde & Rydge 2006; Dennis & Weston 2001; Kini & Mian 1995; Rubin 2007 ; Sarin et al., 2000; Zhou 2011). Other studies document a relationship between institutional ownership and market liquidity (Barabanov & McNamara 2002; Blume & Keim 2012; Fehle 2004). Similary, there is also evidence which suggests that ownership concentration influences market liquidity (Attig et al., 2006; Brockman et al., 2009; Ginglinger & Hamon 2007; Heflin & Shaw 2000; Jacoby & Zheng 2010; Naes 2004) Nevertheless, the majority of ownership structure-liquidity studies link ownership concentration with market liquidity (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010). In contrast, few studies have investigated the impact of ownership level on market liquidity. As a result, this chapter focuses on both ownership level and concentration on market liquidity. More specifically, it looks at how the insider, institutional and ownership concentration influence market liquidity. This chapter employs a dataset from the UK public listed companies over the period 2003-2012.

This chapter's results support both the trading and adverse selection hypotheses; however, this chapter finds that most of the market liquidity-ownership relationship is driven by institutional ownership rather than by insider ownership. Moreover, the study finds that institutional ownership is positively correlated with market liquidity, suggesting that institutional investors trade more often that other investors. Ownership concentration in terms of largest shareholder and blockholder is negatively correlated with market liquidity, suggesting that institutional blockholders are perceived by market makers to have private information about the firm. This relationship is held across all market liquidity measures. Moreover, this chapter finds evidence that insider ownership is negatively correlated with real friction (i.e., trading activity measure) of market liquidity, but is

positively correlated with total liquidity measures such as proportional bid-ask spread and price impact ratio Amihud (2002). This indicates that insiders are perceived to be among those shareholders that trade on private information.

Finally, the study's results hold in many different specifications including the firm size effect, including other control variables such as financial leverage, research and development expenses and firm age and simultaneous equation specification, in which ownership level, ownership concentration, and liquidity are determined jointly. The main contribution to the financial literature is to provide an extensive empirical analysis on the ownership structure-market liquidity relationship over a ten-year period. This study explores this relationship taking into account the multidimensional concept of market liquidity. The construction of the high-resolution ownership data, together with the recent availability of the BoardEx and annual reports data, allows us to achieve this task.

The rest of this chapter proceeds as follows. Section 4.2 introduces the main hypotheses of the study. Section 4.3 reports the descriptive statistics for the research variables. The empirical results of the relationship between ownership level, concentration and market liquidity are provided in section 4.4. In section 4.5, the study conducts additional tests to confirm the robustness of the results. The final section concludes and summarises the chapter.

4.2 Hypothesis Development

This section provides a detailed discussion on the formulation of the study hypotheses. These testable hypotheses were developed in order to carry out the investigation of ownership level, concentration and market liquidity in the UK market. The development of the research hypotheses is theoretically based on the trading and adverse selection hypotheses.

4.2.1 Insider Ownership and Market Liquidity

The existing literature has documented that insider ownership is negatively related to market liquidity (Chiang & Venkatesh 1988; Dennis & Weston 2001; Kini & Mian 1995; Sarin et al., 2000). This negative effect can be explained as insiders have access to firm-specific information in comparison with institutional investors. For instance, a vast body of literature has documented that greater insider ownership has been associated with a higher degree of information asymmetry

between the firm and market, which leads to lower market liquidity (Copeland & Galai 1983; Glosten & Milgrom 1985; Kyle 1985).

An extant body of empirical studies have concluded that there is a negative relationship between insider ownership and market liquidity. For instance, Chiang & Venkatesh (1988) report a positive relationship between bid-ask spread and insider ownership and they document that insider are informed investors about the firm's private information. In the same spirit, Brennan & Subrahmanyam (1996) argue that higher insider ownership may increase the probability of informed trading, which leads to lower market liquidity. Moreover, Sarin et al. (2000) as well as Dennis & Weston (2001) conclude that insiders are better informed about the firm's private information than outsider investors (i.e., institutional investors), and therefore, this leads to a wider bid-ask spread and lower market liquidity.

The empirical evidence regarding the relationship between insider ownership and market liquidity is inconsistent. Some studies have reported a positive relationship between the two variables; others have found a negative relationship. This evidence has been supported by Sarin et al. (2000) who use a sample of 786 for AMEX and NYSE for the year 1985 and conclude that the relative and quoted bid-ask spread were found to be positively significantly associated with insider ownership, whereas there is a negative relationship between insider ownership and quoted depth. They suggest that higher adverse selection costs in firms with higher factional insider ownership are consequences of the increased probability of insider trade. Moreover, their result indicates that, after controlling for insider trading, they observe an insignificant relationship between information asymmetry and insider ownership. This suggests that the higher level of information asymmetry in the firms with larger insider ownership is a result of higher probabilities of insider trading. Dennis & Weston (2001) provide further support in the US for this perspective; they test the relationship between insider ownership and the quoted bid-ask spread, for 5500 NYSE, AMEX, and NASDAQ firms and report that firms with higher proportions of insider ownership have a higher quoted bid-ask spread.

Furthermore, the existing literature has suggested that insider ownership affects both the real and information friction of market liquidity (Comerton-Forde & Rydge 2006; Rubin 2007). These studies document that insiders are informed traders about the firm's private information and tend to turn over their portfolio less often than other investors do, which increases the bid-ask spread and leads to a decrease in market liquidity. For the US market, Rubin (2007) examines the effect of

insider ownership on market liquidity using a sample of 1369 NYSE firms for the period 1993-2003. He reports a positive and significant relationship between insider ownership and quoted, realised and effective bid-ask spreads and Amihud (2002) illiquidity ratio. In contrast, he concludes that there is a negative relationship between insider ownership and trading volume. In Australia, Comerton-Forde & Rydge (2006) investigate the effect of insider ownership on illiquidity. Using 667 ASE listed firms from 1998 to 2003, their findings show a statistically significant positive relationship between insider ownership and market liquidity between 0% to 5% insider holdings; then a more statistically significant and positive relationship between 5% to 10%; and finally a statistically significant and negative impact at 10% and more. They suggest that at a low level of insider ownership, there is a positive and significant relationship between insider ownership and market liquidity.

Further, Zhou (2011) tests the relationship between ownership structure and liquidity and trade informativeness, using a sample of NYSE firms for the period July to September 2000. He finds that there is a negative relationship between insider ownership and market liquidity. Zhou (2011) implies that insider investors are informed investors about the firm's private information regarding the firm's prospects. In particular, he implies that there is a strong positive relationship between insider ownership and bid-ask spread, and insider ownership has a negative statistical significance. In addition, there is a positive and statistically significant relationship between insider ownership and trade informativeness. Based on the above discussions, the following hypothesis is proposed:

Hypothesis 1*: There is a negative relationship between insider ownership and market liquidity.*

4.2.2 Institutional Ownership and Market Liquidity

The existing literature has attempted to examine the relationship between institutional ownership and market liquidity, and has reported inconsistent conclusions. Two streams of literature have emerged to investigate the above-mentioned relationship. From the adverse selection perspective, institutional investors are less informed about the firm's private information than insider investors (Brockman et al., 2009; Chiang & Venkatesh 1988; Kini & Mian 1995; Rubin 2007). Using 63 NYSE firms in 1973, Chiang & Venkatesh (1988) find no effect of institutional ownership on the quoted bid-ask spread and they conclude that market makers do not regard institutions as informed traders. In the US, Kini & Mian (1995) report a significantly negative relationship between institutional ownership and bid-ask spread for 1063 NYSE listed firms for 1985. They suggest that

institutional ownership increases market liquidity. In contrast, Sarin et al. (2000) use a sample of 786 for AMEX and NYSE for year 1985 and find a positive relationship between institutional ownership and bid-ask spread wheras they report a negative impact of institutional ownership on the quoted depth.

They document that this positive relationship is due to the effect of institutional on the real friction of the market liquidity (i.e. the inventory and the order processing cost of bid-ask spread) positively. Moreover, Dennis & Weston (2001) investigate the impact of institutional ownership on quoted and adverse component of bid-ask spread in 5500 NYSE, AMEX, and NASDAQ firms, over the period from Q4 of 1997 to Q4 of 1998. They find that institutional ownership is positively and significantly related to quoted and adverse selection component of bid-ask spread and suggest that institutional investors are better informed about the firm's prospect information than individual investors. However, Fehle (2004) investigates the impact of institutional ownership on market liquidity, measured by quoted and effective bid-ask spread, in 10,107 NYSE listed firms, over the period from 1980 to 1996. He concludes that there is a negative relationship between institutional ownership, quoted and effective bid-ask spread, and suggests that institutional are uninformed investors regarding the firm's private information.

Nevertheless, another stream of theoretical studies has suggested that institutional ownership can affect market liquidity from a trading perspective. For instance, institutional investors as a group trade more often, which increases market liquidity (Gompers & Metrick 2001; Hamilton 1978; Schwartz & Shapiro 1992; Tinic 1972). Consequently, recent literature has suggested the use of different proxies of market liquidity in order to capture the multidimensional nature of market liquidity (Stoll 2000). For instance, in the US Rubin (2007) examines the effect of institutional ownership on market liquidity using a sample of 1369 NYSE firms for the period 1993-2003. He finds that there is a positive relationship between institutional ownership and market liquidity. In particular, he documents that institutional ownership is positively related trading volume and quoted depth; however it is negatively related to quoted and effective bid-ask spread and price impact ratio. Based on the above discussion, the following hypothesis is proposed:

Hypothesis 2*: There is a positive relationship between institutional ownership and market liquidity.*

4.2.3 Blockholders and Market Liquidity

The existing literature has attempted to examine the relationship between blockholders and market liquidity, and has reported that they have access to valuable private firm's information, which leads to a lower market liquidity (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010; Naes 2004). For example, Heflin & Shaw (2000) examine the effect of blockholders on market liquidity for a sample of 260 US firms for the period 1988 through 1989. They find a positive and significant relationship between blockholders and relative and quoted bid-ask spread and informed trading component of the effective spread. In the line with this, Naes (2004) investigates the relationship between ownership concentration and market liquidity in the Norwegian equity market and finds a positive relationship between the bid-ask spread and blockholders.

Nevertheless, the empirical studies that have examined the impact of blockholders on market liquidity have been inconsistent (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010). In the US, Heflin & Shaw (2000) investigate the impact of both insider manager and non-manger blockholders on market liquidity, measured by quoted, effective, and adverse selection components of bid-ask spread and depth, in 260 US listed firms, over the period from 1988 to 1989. They report that there is a positive relationship between blockholders either by managers or external entities and quoted and effective bid-ask spread and adverse selection spread components and smaller quoted depth. In the same spirit, Rubin (2007) finds that there is a positive relationship between blockholders and bid-ask spread and price impact illiquidity ratio. Moreover, he concludes that blockholders reduce market liquidity.

Similarly, Brockman et al. (2009) test the relationship between blockholders and market liquidity measured by real, information and total liquidity costs for 1225 NYSE and AMEX companies over the period from 2000 to 2006. They find that blockholders have a negative impact on market liquidity. In particular, after controlling for the real friction effect, they find little evidence that blockholders have a negative impact on information friction of market liquidity (i.e., adverse selection component of bid-ask spread). Their findings suggest that the relative lack of trading, and not the threat of informed trading, explains the negative relationship between blockholders and market liquidity. Moreover, they report a negative relationship between blockholders and real friction of market liquidity (number of trades and turnover ratio). Similar to this, Jacoby & Zheng (2010) revisit the relationship between ownership concentration and market liquidity and use 1071 NYSE, 323 AMEX and 2182 NASDAQ firms for the year 1995. They use two dimensions of

ownership concentration both number of shareholders and blockholders and measure market liquidity by bid-ask spread, probability of informed trading (PIN), depth, and trading volume. For NYSE/AMEX, they report a positive relationship between blockholders and bid-ask spread and PIN, whereas is they document a negative relationship between blockholders and quoted depth and dollar trading volume. With respect to the number of shareholders, Jacoby & Zheng (2010) report a positive relationship between the number of shareholders and quoted and effective bid-ask spread. However, they report that there is no relationship between the number of shareholders and adverse selection bid-ask spread and PIN. For NASDAQ stocks, they document a positive relationship between blockholders and PIN and bid-ask spread and a negative relationship with trading volume. Nevertheless, they report that the relationship between blockholders and quoted depth is not significant. Regarding the number of shareholders, they conclude a positive relationship between the number of shareholders and dollar trading volume. However, they report that the relationship between number of shareholders and PIN and quoted depth is not significant. Based on the above discussion and from an adverse selection theory perspective, the following hypothesis is proposed:

Hypothesis 3*: There is a negative relationship between blockholders and market liquidity.*

4.2.4 Large Shareholders and Market Liquidity

Recent literature has documented that using the blockholder as a sole measure of ownership concentration causes bias in the previous research's results (Comerton-Forde & Rydge 2006; Jacoby & Zheng 2010; Rubin 2007). These studies used different proxies of ownership concentration in order to reduce any bias from the arbitrary cut-off point. The existing literature has suggested that large shareholders are among the most influential shareholders of a firm (Claessens et al., 2000; La Porta et al., 1999). If they become actively involved in the management of the firm, they can influence corporate decisions in such a way that the value of the firm increases. However, any active role of large shareholders also brings adverse selection costs that reduce market liquidity For example, Coffee (1991) was among the first to point out that active role of large shareholders and the liquidity of shares of their companies cannot go hand on hand. Moreover, large shareholders are in a better position to extract some private information about the firm's prospects than outside investors (Demsetz 1983; Fama & Jensen 1983; Stein 1988, 1989).

Nevertheless, the empirical evidence about the impact of large shareholders and market liquidity is comprehensive (Attig et al., 2006; Ginglinger & Hamon 2007; Naes 2004; Rubin 2007). A number

of studies have suggested that large shareholders have a negative impact on market liquidity (Attig et al. 2006; Ginglinger & Hamon 2007). For instance, Naes (2004) reports that there is a positive relationship between the aggregate top five large shareholders and quoted and effective bid-ask spread and adverse selection component of bid-ask spread. However, he records that there is no relationship between ownership concentration and depth. In France, Ginglinger & Hamon (2007) report a positive relationship between controlling shareholder and bid-ask spread and they suggest that controlling shareholders are informed traders for 918 French listed firms from 1998 to 2003. Moreover, they find that the deviation of control from ownership has a positive relationship with bid-ask spread and adverse selection component of bid-ask spread and an insignificant negative relationship with depth. In contrast, they find that there is no impact for widely held shares and double voting rights on market liquidity.

In Canada, Attig et al. (2006) examine the relationship between ultimate control and ownership and market liquidity measured by quoted and adverse selection component of bid-ask spread in a sample of 1031 Canadian listed firms. Their findings reveal that there is a positive relationship between closely held firms and bid-ask spread and adverse selection component of bid-ask spread, whereas the widely held firms have a positive impact on market liquidity. Furthermore, in Australia, Comerton-Forde & Rydge (2006) test the relationship between ownership concentration and illiquidity; different proxies of ownership concentration have been used such as the top twenty shareholders, large shareholders measured by Herfindahl index of concentration, retail shareholdings, number of shareholders, and insider ownership. They report a positive relationship between ownership concentrations and bid-ask spread and a negative relationship between ownership concentration and turnover ratio. However, the number of shareholders has a positive impact on turnover ratio and a negative impact on bid-ask spread. They apply a further check, which is the simultaneous equation bias; their findings provide no evidence to indicate ownership is endogenous and therefore no simultaneous equation bias is present. Overall, this study hypothesises that:

Hypothesis 4*: There is a negative relationship between large shareholder and market liquidity.*

4.3 Descriptive Statistics

This section presents the descriptive statistics for dependent, independent and control variables. Table 4.1 uses mean, median, standard deviation, maximum, minimum, percentiles, skewness and

kurtosis values to describe the data over the period 2003-2012. In addition, Tables 4.2 and 4.3 present the breakdown of ownership structure and market liquidity variables respectively according to the industry. The mean is provided for nine industries within the FTSE All-Share Index. In the last part in this section, Table 4.4 reports the mean and median differences for the ownership and market liquidity variables in large and small firms. According to Table 4.1, the average of insider ownership (IO) is 10.35% with a standard deviation of 18.7%. In addition, Table 4.1 indicates that the average (standard deviation) for blockholder ownership (BKO) is 18.8% (18.15%) respectively. Moreover, the values for BKO range from zero to a maximum value of 48.8%. Furthermore, Table 4.1 reports that the average (standard deviation) for largest shareholders (LS) is 23% (21%) respectively. Table 4.1 also indicates that the average value of institutional ownership (INSO) in the UK is 72%. These figures are consistent with recent UK studies (Florackis & Ozkan 2009; Geiler & Renneboog 2014; Khurshed et al., 2011; Ozkan 2007).

Table 4.1 also presents the descriptive statistics for market liquidity variables. Table 4.1 reports that the proportional bid-ask spread (PBAS) is 1.6%. The value for PBAS ranges from zero to a maximum value of 25.4%. In addition, the average value of trading volume is 2442 in thousands. These figures are consistent with prior UK studies (Menyah & Paudyal 1996). With respect to the number of trades (NT), the average value of the number of trades is 671.0; this figure is similar to the finding of (Menyah & Paudyal 1996). The last part of Table 4.1 describes the control variables. The average market value of equity (MV) is 2562 million with a maximum value of 43,239.9 million. This is consistent with the results reported by Menyah & Paudyal (1996). The share price (P), which is expressed in pence, has an average of 287.08 and ranges from a minimum value of 0.03 to a maximum value of 3084.39 in the UK firms. Finally, according to Table 4.1 the average total risk (VOL) in the UK firms is 18.2% with a standard deviation of 22.8%.

The descriptive statistics in Table 4.1 show that the skewness and kurtosis figures reveal that most of the variables are not normally distributed. For instance, the data are considered to be normally distributed if the skewness value is ±1.96 and the kurtosis value is within ±3 (Haniffa & Hudaib 2006). In order to overcome this problem this study transforms all the study's variables by using the natural logarithm following the previous studies (Brockman et al., 2009; Heflin & Shaw 2000).

Table 4.1 Descriptive Statistics of the whole Sample

Table 4.1 presents the time series average of cross-sectional means, medians, standard deviations, maximum, minimum, percentiles, skewness and kurtosis during the sample period from December 2002 to December 2012 for UK companies. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), number of trades (NT), firm size (MV), share price (P) and return volatility (VOL). See Table 3.2 for variables' definition and measurements.

	Mean	Median	Stdev	Max	Min	25 p	75 p	Skewnes	Kurtosis
VOL	0.1823	0.0769	0.2282	0.9933	0.0001	0.0575	0.2092	1.91	5.59
MV in millions £	2562.31	432.7	7501.12	43239.9	0.0523	69.4	927.95	4.59	23.86
VO in thousand	2442.76	496.01	5790.39	36070.97	0.3007	78.73	2439.02	4.37	23.41
PBAS in pence	0.0167	0.0056	0.0235	0.2547	0.0001	0.0028	0.0247	2.00	7.30
P	287.08	204.89	376.95	3084.39	0.0386	43.63	424.12	3.52	21.35
NT	671.02	220.65	1298.00	6947.7	0.0055	30.44	630.08	12.47	3.05
TR	0.0071	0.0046	0.0114	0.0986	0.0000	0.0029	0.0068	30.88	4.98
TZ	6.263	2.900	14.31	432.28	0.0001	0.6947	6.0580	14.48	389.20
Pimpact	0.0002	0.0000	0.0005	0.0085	0,0000	0.0000	0.0001	8.95	103.90
IO	0.1035	0.0096	0.1877	0.7504	0.0001	0.0039	0.0723	2.03	5.82
LS	0.2296	0.2345	0.2073	0.5373	0.0020	0.009	0.4299	0.23	1.46
BKO	0.1880	0.0888	0.1815	0.4888	0.0033	0.0093	0.3634	0.44	1.57
INSO	0.7224	0.7683	0.1844	0.9443	0.4079	0.5558	0.8866	-0.41	1.75

Figure 4.1 shows the means of insider, institutional, and ownership concentration (i.e., blockholders and largest shareholders) according to the industry breakdown. Moreover, Table 4.2 shows that higher insider ownership is in basic materials and telecommunication with an average of 17% and 16% respectively. However, the lower insider ownership appears in the utilities companies with an average of 1%. With respect to ownership concentration, as shown in Table 4.2 utilities companies have the lowest large shareholder and blockholders with an average of 4%. In contrast, basic materials and technological firms have the largest shareholder with an average of 29% and 27% respectively. Moreover, basic materials firms have the highest blockholders with an average of 23%. Regarding institutional ownership, utilities companies have the highest institutional ownership with an average of 83%. In contrast, basic materials firms have the lowest institutional ownership with an average of 66%. In conclusion, utilities firms have the lowest insider and ownership concentration, whereas basis materials firms have the highest insider and ownership concentration. As a result, this study expects that utilities firms will have highest market liquidity in comparison with other industries mainly the basic materials firms.

Regarding market liquidity, Figures 4.2, 4.3, 4.4, and 4.5 and Table 4.3 report the mean for market liquidity variables according to the industry breakdown. As shown in Table 4.3, health care and

industrials companies have the highest proportional bid-ask spread (PBAS), 1.88% and 1.85% respectively. In contrast, utilities companies have the lowest PBAS with an average of 0.55%. Regarding price impact ratio (Pimpact), utilities and oil & gas companies have the lowest price impact ratio with 0.0000 and 0.0000 respectively. Nevertheless, health care, telecommunication and technology have the highest Pimpact ratio with an average of 0.02%. Table 4.3 also shows that technological firms have the lowest number of trades (NT) and trading volume (VO) with an average of 338.21 and 994.8 respectively. In contrast, the telecommunication companies have the higher number of trades and trading volume, 1317.74 and 13114.12 respectively. Regarding turnover ratio (TR), technological firms have the highest turnover ratio average of 0.94%. In contrast, telecommunication companies have the lowest average of 0.41%. With respect to the trade size (Tsize), utilities firms have the lowest Tsize with an average 3.00. Nevertheless, health care companies have the highest Tsize with an average of 11.09.

Taken together, this study finds that utilities companies have the highest market liquidity in comparison with other industries, mainly the telecommunication and technological firms. Consequently, from the above results this study strongly recommends to control for the industry effect following recent studies in this area such as Poon et al. (2013).

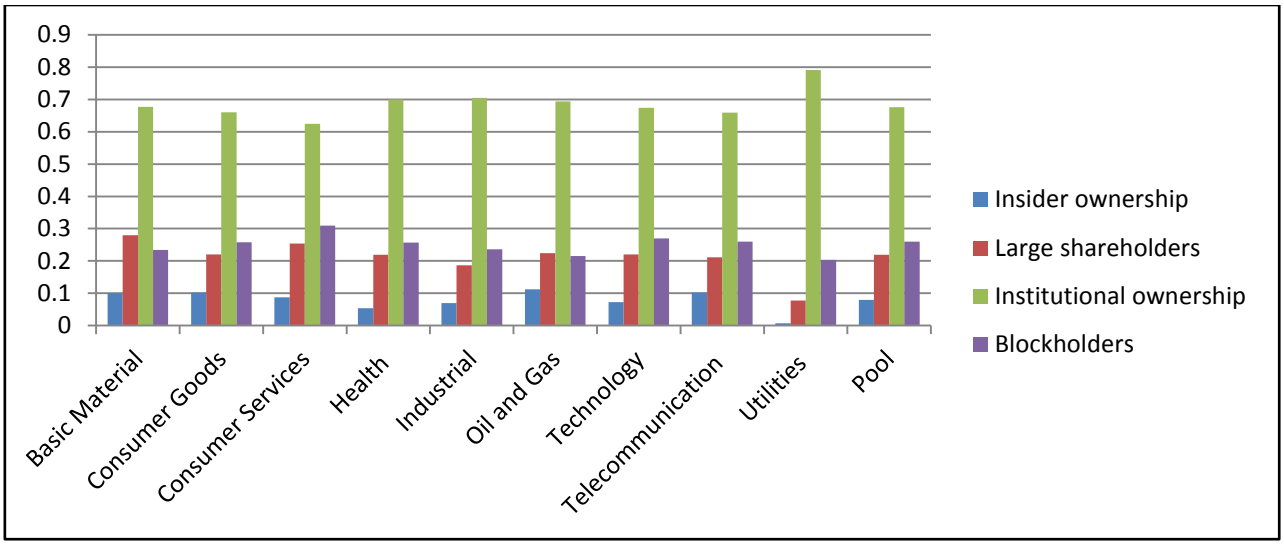

Figure 4.1 Ownership Variables Accounting for Differences in Industry Sectors.

Table 4.2 Means of Ownership Structure Accounting for Differences in Industry Sectors and Pool Sample of 2003-2012

Table 4.2 presents the average of ownership structure variables according to the industry classification for the years 2003 to 2012. For ownership structure, this study uses insider and institutional ownership and ownership concentration (i.e. blockholders and large shareholders).

Industry	Insider Ownership	Large Shareholder	Blockholders	Institutional Ownership
Oil & Gas	0.11	0.21	0.18	0.74
Basic Materials	**0.17**	**0.29**	**0.23**	**0.66**
Industrials	0.07	0.20	0.16	0.74
Consumer Goods	0.11	0.24	0.18	0.71
Health Care	0.05	0.26	0.21	0.77
Consumer Services	0.11	0.25	0.21	0.68
Telecommunication	0.16	0.21	0.18	0.71
Utilities	**0.01**	**0.04**	**0.04**	**0.83**
Technology	0.10	0.27	0.21	0.70
Pool	0.10	0.22	0.18	0.73

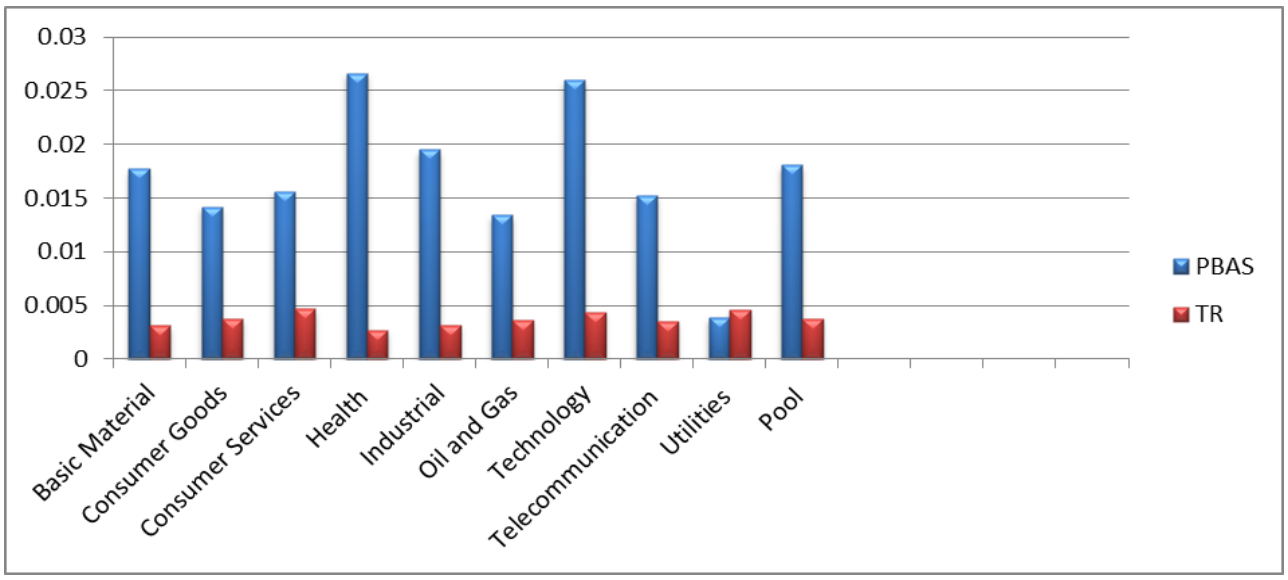

Figure 4.2 Proportional Bid-ask Spread and Turnover Ratio Accounting for Differences in Industry Sectors

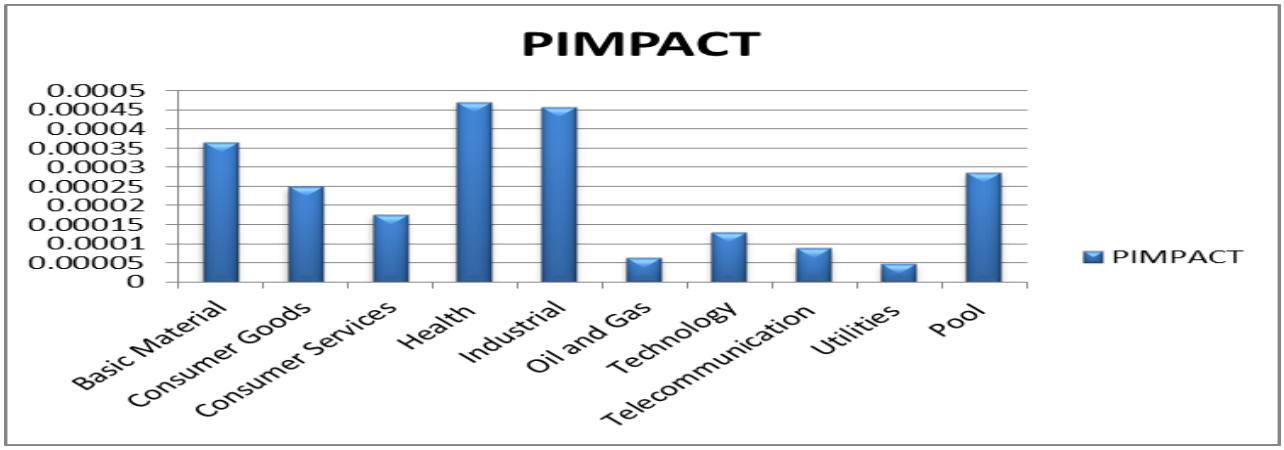

Figure 4.3 Price Impact Ratio Accounting for Differences in Industry Sectors

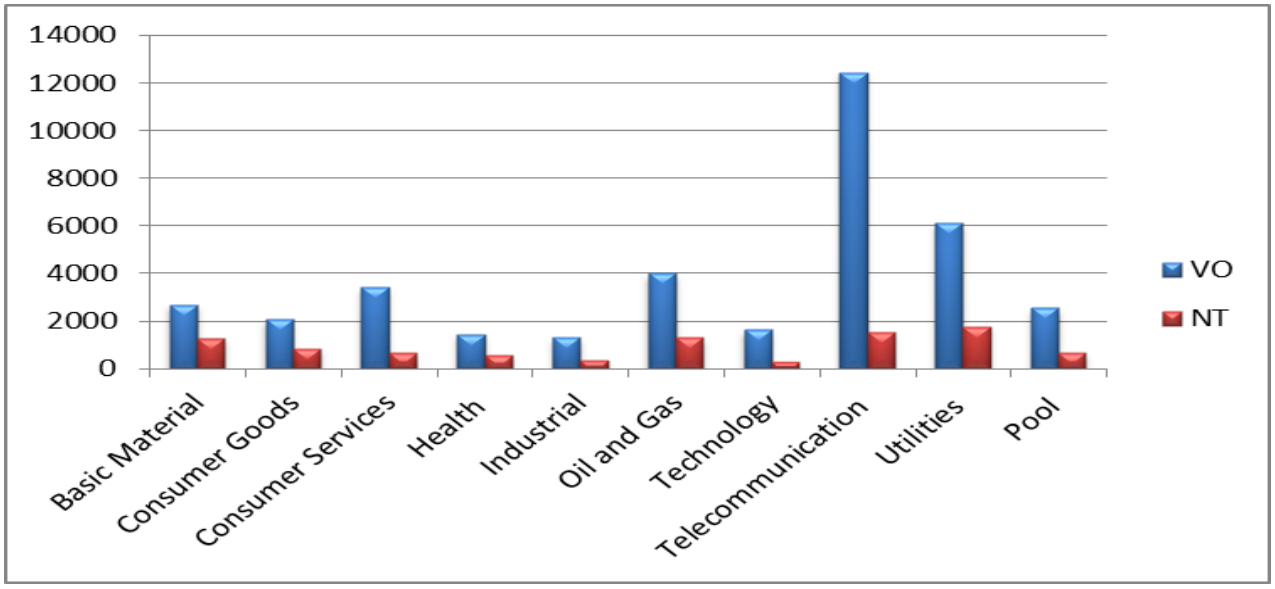

Figure 4.4 Number of Trades and Trading Volume Accounting for Differences in Industry Sectors

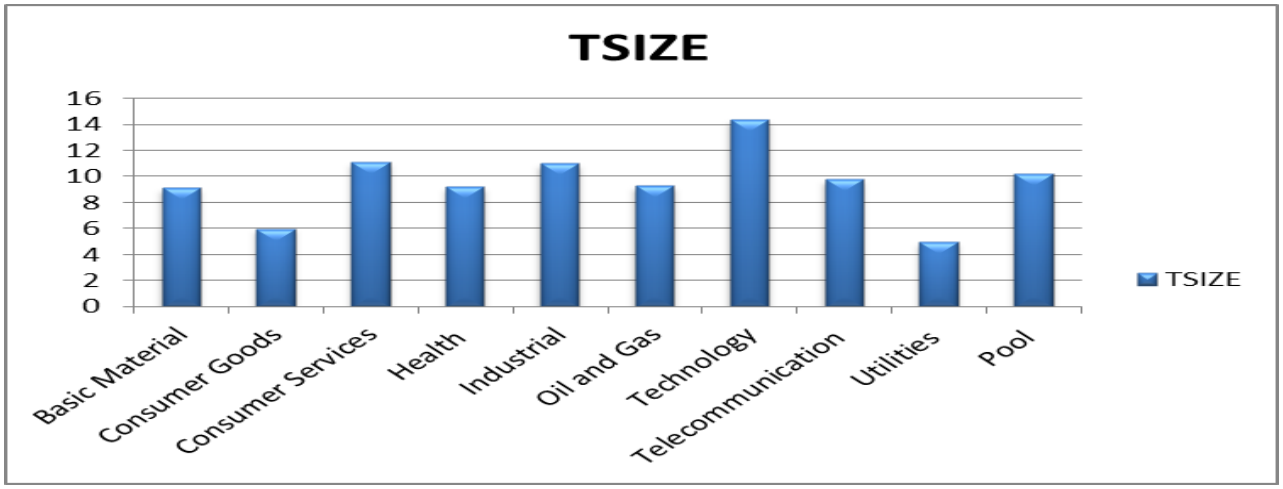

Figure 4.5 Trade Size Accounting for Differences in Industry Sectors

Table 4.3 Means of Market Liquidity Accounting for Differences in Industry Sectors and Pool Sample of 2003-2012

Table 4.3 presents the average of market liquidity measures according to the industry classification for the years 2003 to 2012. For market liquidity this study uses proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TSIZE), trading volume (VO) and number of trades (NT).

Industry	PBAS	NT	TR	TSIZE	Pimpact	VO
Oil & Gas	0.0133	1142.52	0.0072	7.29	0.0000	3812.22
Basic Materials	0.0165	1297.06	0.0050	6.42	0.0001	1847.23
Industrials	0.0185	357.29	0.0068	6.30	0.0001	1386.80
Consumer Goods	0.0145	766.05	0.0071	3.54	0.0001	2045.73
Health Care	0.0188	1048.67	0.0044	11.09	0.0002	2189.92
Consumer Services	0.0143	556.95	0.0087	6.38	0.0001	2665.13
Telecommunication	0.0163	1317.74	0.0041	6.73	0.0002	13114.12
Utilities	0.0055	1273.58	0.0055	3.00	0.0000	4592.39
Technology	0.0257	338.21	0.0094	6.90	0.0002	994.84
Pool	0.0159	899.79	0.0065	6.41	0.0001	3627.60

Firm Size Effect

To study the effect of the firm size on the ownership structure and market liquidity variables, this study stratifies UK firms into two size groups. The large (small) firm group includes firms with size above (below) the median of the market value of equity (MV) of the UK sample firms. The means, median and standard deviation for ownership structure and market liquidity variables are reported in Table 4.4. This study implies both parametric and non-parametric test in order to test the differences in means and median of the above-mentioned variables between small and large UK firms; both the t-statistics and Wilcoxon signed-rank test are used to test the mean and median differences respectively. Table 4.4 reports that on average small UK firms have a lower number of trades, trade size, turnover ratio, and sterling pound trading volume relative to the UK large firms.

Nevertheless, it is noticeable from Table 4.4 that small UK firms have the higher proportional bid-ask spread (PBAS) and price impact ratio Amihud (2002) illiquidity ratio (Pimpact) in comparison with the large UK firms. All the figures are significant at (1% level). With respect to ownership structure variables, small UK firms have higher ownership concentration (i.e., blockholdings and largest shareholders) and insider ownership whereas they have less institutional ownership in comparison with large UK firms. These finding are in line with the previous studies (Jacoby &

Zheng 2010; Kini & Mian 1995; Williams 1986). These studies document that small firms have more information asymmetry between firms and market than large firms. Existing literature has documented that the relationship between blockholders and insider ownership and quoted bid-ask spread is more significant and stronger for small firms. Specifically, smaller firms often have a smaller number of insiders, which gives them more ability to access private information about the firm's prospect than outside investors (i.e., institutional investors), which leads to lower market liquidity (Jacoby & Zheng 2010; Kini & Mian 1995).

Nevertheless, as shown in Table 4.4, larger UK firms have more institutional ownership (INSO) than small firms. This is in line with previous studies (Chiang & Venkatesh 1988; Jacoby & Zheng 2010; Kini & Mian 1995; Tinic 1972). These studies have stated that larger firms are more dispersed; in other words, they have more number of shareholders. In particular, these studies conclude that, when the ownership is held by outsider shareholders, this will increase the probability that more investors will participate in the trading operation in the capital market, which leads to an increase in the market liquidity. Overall, this study notices from Table 4.4 that small firms have more insider and ownership concentration, which leads to more total liquidity costs (i.e., proportional bid-ask spread and price impact ratio) and lower real friction of market liquidity (i.e., turnover ratio, number of trades, trade size and trading volume) in comparison with large firms.

Moreover, recent studies have suggested using the firm's size effect as a robustness and consistency test to detect if the firm's size has an effect on the relationship between ownership structure and market liquidity (see Jacoby & Zheng 2010; Kini & Mian 1995). This study notices from Table 4.4 that the firm's size has a strong and significant effect (at 1% significant level) on both market liquidity and ownership variables. Consequently, the study investigates the effect of the firm's size on the relationship between ownership level, concentration and market liquidity as a further test to check the consistency of the results of firm's size effect with the main results, as we will see later in this chapter.

Table 4.4 Descriptive Statistics for Large and Small Firms

Table 4.4 presents the mean and median differences of insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), and number of trades (NT). Firms are sorted according to the market value: firms above the median of market value are classified as large and those below the median are classified as small. See Table 3.2 for variables' definition and measurements.

Large Firms				Small Firms			Differences	
Variables	**Mean**	**Median**	**Standard deviation**	**Mean**	**Median**	**Standard deviation**	**t-statistics**	**Wilcoxon signed-rank test**
VO	3899.48	793.09	7376.39	988.88	255.65	2912.67	12.04***	16.352***
PBAS	0.0072	0.0037	0.0147	0.0263	0.0208	0.0265	-20.31***	-19.536***
NT	1090.49	444.98	1640.31	252.37	45.68	575.69	15.69***	17.751***
TR	0.0080	0.0050	0.0125	0.0063	0.0039	0.0102	3.52***	7.220***
TZ	3.962	2.336	7.221	8.55	3.84	18.63	-7.33***	-10.044***
PIMPACT	0.0001	0,0000	0.0002	0.0003	0.0001	0.0007	-9.83***	-18.646***
IO	0.0871	0.0077	0.1789	0.1198	0.0285	0.1948	-4.12***	-5.906***
LS	0.1852	0.0677	0.2054	0.2739	0.2853	0.1997	-10.04***	-10.573***
BKO	0.1589	0.0595	0.1784	0.2171	0.2282	0.1799	-7.13***	-7.445***
INSO	0.7544	0.825	0.1831	0.6905	0.7066	0.1801	7.94***	7.555***

***,**,* represent significance at the 1%, 5% and 10% levels respectively.

Correlation Matrix

This section presents and discusses the Pairwise correlations among the insider, institutional, and concentration ownership (i.e. blockholder and largest shareholders), market liquidity and control variables. The correlation coefficients are tested in order to check if there is a high collinearity among independent variables. The term collinearity indicates that two predictors have a near perfect linear relationship. The importance of detecting such a problem is that the regression model estimates of the coefficients become unstable as the level of multicollinearity increases. Statistically, it has been suggested that multicollinearity may damage or threaten the regression analysis if the degree of correlation exceeds 80% (Gujarati 2003; Hair et al., 1998). Therefore, this percentage is adopted as the threshold in this study to detect the presence of the problem of multicollinearilty in the residuals.

As shown from Table 4.5 this study notices that most of the correlation coefficients between the study's variables are low but there are still some relatively high correlations between some of those variables. It is noticeable from Table 4.5 that the highest correlation, compared with other variables, is found between the large shareholders (LS) and blockholders (BKO) (75%) which is in line with prior UK studies (Florackis & Ozkan 2009; Ozkan 2007b). Consequently, this relatively high correlation is expected. In addition, Table 4.5 reports that proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) is highly negatively correlated with number of trades (NT) and trading volume (VO). Our results are in the line with previous US studies (Rubin 2007). Statistically, Brooks (2008) states that when the correlation coefficient between the variables is

high, it could indicate near multicollinearity that will make the standard error of the variables high, which will make those variables insignificant. Moreover, he documents that when the multicollinearity exists the regression model will become very sensitive to any changes in the independent variables and adding or removing any variable will affect the model sharply. As a result, Brooks (2008) suggests a number of solutions to this problem.

First, is to ignore it, especially if the variables' coefficients have the correct sign and magnitude value. Second, is to drop one of the collinear variables; unfortunately, sometimes the variables with high correlations are important for explaining the dependent variable, so we cannot drop any of them. Third, is to transform the highly correlated variables into a ratio; this may be unacceptable, especially if the theory suggests that the relationship should be a certain nature that does not include the variable as a ratio. However, a well-known technique is employed in order to detect the problem of multicollinearity in our models. In particular, this study calculates the variance inflation factor (VIF) test, where the variance factors of each variable are computed. The existence of multicollinearity in the model can be discovered if the value of the variance inflation factors is more than 10. Both the VIF test and the pairwise rank correlation confirm that there is no intercorrelation among the study's independent variables in our model. This study ran the VIF command after each model to detect if there is multicollinearity in the regression, as we will see later in the main analysis section. Moreover, this study estimates robust standard error to control for serial correlation and heteroscedasticity using the option "Robust" in STATA 11.

Table 4.5 Correlation Matrix for the Research Variables

Table 4.5 presents the correlation between the variables used in the study. Insider ownership (IO) is the total percentage of shares owned by all directors (executive and non-executive directors), institutional ownership (INSO) is the total percentage of shares held in positions by institutional investors, blockholders (BKO) is the total percentage of shares held in positions of greater than 3% owned by external investors, largest shareholders (LS) the top 5 non-insider institutional investors, proportional bid-ask spread (PBAS) is calculated by dividing the quoted bid-ask spread over the mid-point of quoted bid-ask spread, turnover ratio (TR) is the trading value divided by market capitalisation, price impact ratio (Pimpact) is the ratio of absolute returns divided by trading value, trade size (TZ) is the share trading volume divided by the number of trades, trading volume (VO) as the total number of shares volume traded during the month, firm size (MV) represents the market capitalisation expressed in millions, share price (P) is the stock price at the end of the month and return volatility (VOL) is measured as the standard deviation of the squared stock return.

	PBAS	**PIMPACT**	**VO**	**TR**	**TZ**	**NT**	**IO**	**BKO**	**LS**	**INSO**	**MV**	**VOL**	**P**
PBAS	1.0000												
Pimpact	0.4871*	1.0000											
VO	-0.4018*	-0.6415*	1.0000										
TR	-0.1670*	-0.3534*	0.3411*	1.0000									
TZ	0.4331*	-0.0410	0.0540	0.0638*	1.0000								
NT	-0.6304*	-0.5376*	0.4781*	0.2457*	-0.3830*	1.0000							
IO	0.1661*	0.3846*	-0.3319*	-0.1338*	-0.1550*	-0.2068*	1.0000						
BKO	0.2700*	0.2153*	0.1808*	-0.0617*	0.1387*	-0.2711*	0.1820*	1.0000					
LS	0.3176*	0.2912*	-0.2617*	-0.1264*	0.1402*	-0.3194*	0.2521*	**0.7553***	1.0000				
INSO	-0.3724*	-0.2085*	0.1808*	0.0401	-0.2871*	0.3556*	-0.2009*	-0.4042*	-0.4775*	1.0000			
MV	-0.5057*	-0.5341*	0.4503*	0.1654*	-0.2171*	0.5235*	-0.1510*	-0.2122*	-0.2823*	0.2432*	1.0000		
VOL	0.2323*	0.2463*	-0.1494*	0.0306	0.0575*	-0.1642*	0.0571*	0.2092*	0.2372*	-0.1457*	-0.3019*	1.0000	
P	-0.2878*	-0.0546*	0.0222	0.0468*	-0.4110*	0.2754*	0.1467*	-0.1044*	-0.1510*	0.1379*	0.2830*	-0.2210*	1.0000

*indicates significance at 5% level or better.

4.4 Results and Analysis

This section presents and discusses the results of both univariate and multivariate analyses. The results are outlined first for univariate analysis, which is based on constructing portfolios based on ownership level and concentration. Following that, this study reports the results of pooled ordinary least squares (OLS) year and industry dummies that examine the relationship between ownership level, concentration and market liquidity, which is measured by proportional bid-ask spread, price impact ratio (Amihud's 2002 illiquidity ratio), turnover ratio, number of trades, trade size, and trading volume.

4.4.1 Univariate Analysis

This section starts with the issue of examining the prediction that stocks with higher insider ownership and ownership concentration (i.e., blockholders and largest shareholders) have lower market liquidity relative to the stocks with higher institutional ownership. Table 4.6 reports market liquidity proxies for the portfolio constructed based on stocks that have been ranked in ascending order according to insider, institutional, blockholders and largest shareholders as a measure of ownership variables. In particular, stocks have been sorted into two equally weighted portfolios which are above and below the median value according to the ranking variables. The means for ownership structure and market liquidity variables are reported in Table 4.6. This study implies both parametric and non-parametric test in order to test the differences in means of market liquidity proxies according to the two portfolios; both the t-statistics and Wilcoxon signed-rank test are used to test the mean and median differences respectively.

The results in Table 4.6 Panel A reveal that, in most cases, average portfolio market liquidity as measured by proportional bid-ask spread and price impact ratio increase monotonically with block ownership. For example, the proportional bid-ask spread (price impact ratio) is 2.2% (0.02%) for firms with higher blockholders, which is significantly higher than stocks with lower blockholders, which is 1.1% (0.00%). In contrast, regarding the trading activity measure of market liquidity, number of trades and trading volume are larger for lower blockholders than higher blockholders. Overall, this may imply that blockholders are informed investors and have the ability to access the firm's private information. With respect to the trade size, Table 4.6 shows that it is lower for firms with lower numbers of blockholders than firms with higher numbers of blockholders.

Moreover, Table 4.6 Panel B reports that stocks with higher insider ownership have statistically higher proportional and price impact ratio than stock with lower insider ownership. Specifically, the proportional bid-ask spread (price impact ratio) is 1.9% (0.02%) for firms with higher insider ownership is significantly higher for stock with lower insider ownership, which is 1.3% (0.00%). In contrast, regarding the trading activity measure of market liquidity, the turnover ratio shows a monotonic decrease with insider ownership. For instance, firms with higher insider ownership have a significantly lower turnover ratio of 0.6% relative to stock with lower insider ownership where the the turover ratio is 0.7%. Furthermore, number of trades and trading volume are larger for lower insider ownership than higher insider ownership. Overall, this may imply that insider investors are informed about the firm's private information. With the respect to the trade size, Table 4.6 shows that the trade size is larger for firms with lower insider ownership than firms with higher insider ownership.

Regarding large shareholder, Table 4.6 Panel C provides evidence that is consistent with that reported in Panels A and B with regard to the figures of the proportional bid-ask spread and price impact ratio measures. That is, the results also confirm that stocks with large shareholders have statistically significant higher proportional bid-ask spread and price impact ratio than stocks with fewer large shareholders. In particular, the proportional bid-ask spread (price impact ratio) is 2.1% (0.02%) for firms with high largest shareholders, that is significantly higher than stocks with lower shareholders which is 1.1% (0.00%). Nevertheless, regarding the trading activity measure of market liquidity, number of trades and trading volume are higher for firms with fewer large shareholders than firms with a higher number of large shareholders. Overall, this may imply that large shareholders are informed investors and have the ability to access the firm's private information.

With respect to trade size, Table 4.6 shows that it is lower for firms with fewer large shareholders than firms with a higher number of large shareholders. The last measure for ownership is institutional ownership where stocks with a higher institutional ownership are those with higher market liquidity. In contrast with what has been stated in Panels A, B and C, the figures reported in Table 4.6 Panel D reveal the opposite direction regarding the proportional bid-ask spread and price impact ratio, which is 1% (0.00%) for firms with higher institutional ownership, which is significantly higher than stocks with lower institutional ownership, 2.2% (0.00%). Nevertheless, regarding the trading activity measure of market liquidity, number of trades, turnover ratio and trading volume are larger for firms with higher institutional ownership than those where the proporotion of institutional ownership is lower. Overall, this may imply that institutional investors are uninformed investors who turn their portfolio and trade more often than insider investors. With

respect to the trade size, Table 4.6 shows that it is lower for firms with higher institutional ownership than firms where the proportion of institutional ownership is lower.

Table 4.6 Univariate Analysis for Ownership Variables and Market Liquidity

Table 4.6 presents the relationship between ownership level, concentration and market liquidity by using a univariate portfolio approach. Stocks with insider, institutional, large shareholders and blockholders are grouped together in separate portfolios. The sample stocks are divided into two portfolios above and below the mean and median values of insider, institutional, large shareholders and blockhoders. The mean and median differences are tested through the applicatiuon of t-test and Z-values respectively. ***,**,* represent significance at the 1%, 5% and 10% levels respectively.

A brief description of the market liquidity variables is given below. Proportional bid-ask spread (PBAS), number of trades (NT), turnover ratio (TR), trade size (TZ), Price impact ratio (Pimpact), and trading volume (VO). See Table 3.2 for variables' definitions and measurements.

Variable	Mean for Firms Above the Median	t-test Z-values	Mean for Firms Below the Median
Panel A Firms Above and Below the Median of Blockholder			
Proportional Bid -Ask Spread	0.022	10.85*** 11.22***	0.011
Number of Trades (million)	462.99	-7.57*** -10.23***	879.33
Turnover Ratio	0.0072	0.27 -0.91	0.0071
Trade Size	7.96	5.39*** 7.51***	4.57
Price Impact Ratio	0.0002	5.73*** 6.93***	0.00009
Trading volume	1870.45	-4.54*** -6.23***	3026.88
Panel B Firms Above and Below the Median of Insider Ownership			
Proportional Bid- Ask Spread	0.019	6.32*** 7.16***	0.013
Number of Trades (million)	454.95	-7.63*** -8.77***	885.49
Turnover Ratio	0.006	-2.55** -4.40***	0.007
Trade Size	5.87	-1.26 -5.15***	6.67
Price Impact Ratio	0.0002	7.73*** 14.3***	0.0000
Trading Volume	1213.02	-9.95*** -12.6***	3672.33
Panel C Firms Above and Below the Median of Largest Shareholder			
Proportional Bid- Ask Spread	0.021	10.62*** 11.81***	0.011
Number of Trades (million)	422.78	-9.10*** -11.14***	922.36
Turnover Ratio	0.00718	0.018 -3.13***	0.00717
Trade Size	7.81	5.00*** 7.44***	4.69
Price Impact Ratio	0.0002	6.39*** 10.01***	0.0000
Trading volume	1647.67	-6.47*** -7.83***	3257.48
Panel D Firms Above and Below the Median of Institutional Ownership			
Proportional Bid- Ask Spread	0.010	-12.36*** -13.83***	0.022
Number of Trades (million)	993.75	11.83*** 13.35***	351.37
Turnover Ratio	0.007	1.35 1.37	0.006
Trade Size	3.66	-8.32*** -12.50***	8.84
Price Impact Ratio	0.0000	-5.91*** -8.68***	0.00002
Trading Volume	2924.89	3.76*** 6.97***	1980.71

4.4.2 The Effect of Ownership Level and Concentration on Market Liquidity

This section investigates how the ownership level and concentration are related to the market liquidity. Following Poon et al. (2013), the study uses a pooled OLS year and industry dummy to control for the endogeneity that was explained in Chapter 3. In addition, this model includes the lagged ownership variables as explanatory variables in the right hand side of the equation (4.1) in order to control for endogeneity problems in line with the previous work of Brockman et al. (2009) and Heflin & Shaw (2000). Furthermore, the diagnostic analyses of this study discussed in Chapter 3, show that the pooled ordinary least squares (OLS) assumptions are met. Due to the nature of this study's data, a parametric test has been employed. The assumptions or the conditions of OLS estimates were investigated in the methodology chapter and OLS regression was methodologically and statistically found to be particularly relevant with regard to accomplishing this study's analysis.

In the existing literature, some studies have used non-parametric tests in investigating the relationship between ownership structure and market liquidity literature (Ben Ali et al., 2013; Fehle 2004), However, a large number of related previous studies have also used parametric tests and multivariate regressions (Attig et al., 2006; Blume & Keim 2012; Brockman et al., 2009; Chiang & Venkatesh 1988; Dennis & Weston 2001; Ginglinger & Hamon 2007; Heflin & Shaw 2000; Jacoby & Zheng 2010; Kini & Mian 1995; Rubin 2007; Sarin et al., 2000; Zhou 2011). Consequently, this study conducts several methods of estimation in order to measure the relationship between ownership level, concentration and market liquidity, such as untabulated results of fixed and random regression. Unlike other previous studies, this study follows Poon et al. (2013), and employs pooled OLS dummy industry and year in order to control for endogenity and time invariant problems. The following model is used to examine the above-mentioned relationship:

$$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + + \sum_{i=1}^{n} IND_i + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad \ldots\ldots(4.1)$$

Where *LIQ* is market liquidity, *IO* is the insider ownership, *INSO* is the institutional ownership, *BKO* is the blockholder, *LS* is large shareholder, *MV* is market value, *P* is shares price, *VOL* is volatility, *IND* and *YEAR* is the industry and year dummies respectively.

This study reports the main results using pooled OLS year and industry dummy. Table 4.7 reports the results using market liquidity as a dependent variable. Pooled OLS estimate in Table 4.7 suggests a significant relationship between insider ownership and market liquidity. This results

indicates that, after controlling for the share price, firms' size and return volatility, insider ownership has an impact of market liquidity under both total liquidity and real friction (i.e.. trading activity) measures of market liquidity. In particular, Table 4.7 records a significantly negative relationship between insider ownership and market liquidity. Prior studies that apply OLS report similar results (Chiang & Venkatesh 1988; Comerton-Forde & Rydge 2006; Heflin & Shaw 2000; Rubin 2007). As explained in the previous chapters, the interest of this study is in the multidimensional concept of market liquidity (i.e., real and information friction). In light of these findings, hypothesis $\boldsymbol{H_1}$ is accepted for FTSE All-Share companies; which states that is a negative relationship between market liquidity and insider ownership. The negative association is in line with the adverse selection hypothesis. These finding is in accord with previous research findings in this area (see for example, Chiang & Venkatesh 1988; Glosten & Milgrom 1985; Copeland & Galai 1983).

Nevertheless, analysis of the market liquidity produces interesting findings. Insider ownership significantly increase the proportional bid-ask spread and price impact ratio at 1% levels. More importantly, this study finds, that after controlling for trading activity through the use of a liquidity measure that is highly correlated with trading, insider ownership still maintained a positive and significant impact on both the proportional bid-ask spread and price impact ratio. In particular, after controlling the effects of trading activity (i.e., number of trades and trade size), the adverse effect of insider ownership on the bid-ask spread and price impact ratio becomes lower, but a positive and significant relationship still existed between insider ownership and bid-ask spread and price impact ratio.

The results of this study thus provide strong support to the adverse selection hypothesis that insider ownership increases the proportional bid-ask spread and price impact ratio even after controlling trading activity measures. These results support that insider ownership increases liquidity costs because of their '*access to private, value-relevant information*'. Existing literature has stated that firms with higher insider ownership cause market makers to charge higher bid-ask spread because they hold private information about the firm's prospects; however, they trade less in comparison with outside investors (see for example, Chiang & Venkatesh 1988; Dennis & Weston 2001; Kini & Mian 1995; Rubin 2007; Sarin et al., 2000; Zhou 2011, for more details). With respect to the trading activity measures, this study uses number of trades, trade size, turnover ratio and trading volume; the study's findings are consistent with trading activity hypotheses which suggests that

insider ownership reduces the firm's trading activity and that insider owners trade less than institutional investors (see for example, Comerton-Forde & Rydge 2006; Rubin 2007).

Taken together, our trading activity findings in Table 4.7 paint a coherent picture regarding the real friction effects of insider ownership. Specifically, insider ownership reduces the firm's turnover, number of trades, trading volume and average trade size. This is somewhat in line with the theoretical work of Demsetz (1986), who documents that uninformed investors in firms with higher insider ownership tend to adopt a buy-and-hold strategy as they realise that they are relatively uninformed. This leads to lower market liquidity, as the market maker understands that most transactions involve informed investors. According to these results, it appears that insider trades less than outsider investors. To sum up, this study shows that that insider ownership increases the total liquidity costs (real and information friction) through increasing both the firm's proportional bid-ask spread and price impact ratio. After this study controls for the trading activity (i.e. number of trades and trade size), this study's results suggest that the adverse liquidity effect of insider ownership is due to its impact on informational friction costs.

Table 4.7 reports a positive and significant relationship between institutional ownership and market liquidity under the pooled OLS year and industry dummies estimate. This positive result provides support for the trading hypothesis that assumes that institutional investors trade more often than other investors (i.e., insiders). Accordingly, $\boldsymbol{H_2}$ assumes that institutional ownership is an increasing function of market liquidity. It is noticeable from Table 4.7 that institutional ownership has a negative relationship with total costs of market liquidity including proportional bid-ask spread and price impact ratio. However, after controlling for the trading activity measures (i.e., number of trades and trade size), the results show that institutional ownership has a positive and significant effect on the price impact ratio and insignificant effect on the proportional bid-ask spread. Thus the outcome of these findings does not regard institutional investors as informed investors. This finding is in accord with previous research findings (see for example, Fehle 2004; Sarin et al., 2000).

Hence, consistent with some of the previous empirical evidence, it is found that the institutional shareholders in UK firms are passive and ineffective when it comes to monitoring (Coffee 1991; Cosh & Hughes 1997; Franks et al., 2001; Goergen & Renneboog 2001; Maug 1998; Pound 1988). These studies argued that the ineffectiveness and the weak monitoring on the part of institutional investors might be caused by the potential liquidity costs, free rider problems, conflicts of interest, and strategy alignment. That is, institutions rarely behave or take decisions in terms of corporate

monitoring since they pay more attention to liquidity than building up long-term investment, which requires exerting influence over corporate management (Bhide 1994; Coffee 1991; Maug 1998; Ozkan 2007). Nevertheless, with respect to the trading activity measure of market liquidity, Table 4.7 reports that there is an insignificantly positive relationship between institutional ownership and number of trades and trade size and a significantly positive relationship between institutional ownership and trading volume and turnover ratio. These results are in line with previous literature in this rea (see for example, Brockman et al., 2009; Rubin 2007).

Regarding ownership concentration, Table 4.7 reports that ownership concentration (i.e., large shareholder and blockholders) has an effect on market liquidity. In contrast with other previous results that use blockholders as the sole measure of ownership concentration (Brockman et al., 2009; Heflin & Shaw 2000; Kini & Mian 1995), this study uses two dimensions of ownership concentration: blockholders and largest shareholders (top five large shareholders). Following the recent literature in the UK, this study uses blockholders who hold 3% and more of the share capital according to the disclosure requirements of the London Stock Exchange. Furthermore, this study uses another measure of ownership concentration; that is, the top five largest shareholders, in line with previous studies in this area (Naes 2004; Rubin 2007).

Under pooled OLS estimation method, the coefficients on blockholders are negative and significant with market liquidity. Relative to other prior studies, the study's result concerning blockholders provides strong evidence for the adverse selection hypothesis. In particular, Table 4.7 shows that the relationship between the blockholders and proportional bid-ask spread and price impact ratio is positive and significant at 10% and 1% significance respectively. In terms of information friction effect, this study finds that blockholders still have a positive and significant impact on both the proportional bid-ask spread and price impact ratio, once this study controls for trading activity by employing a liquidity measure that is highly correlated with trading. Specifically, after this study controls for the impact of trading activity (i.e., number of trades and trade size), the adverse effect of blockholders on the spread and price impact ratio become lower, but there is still a positive and significant relationship between blockholders and bid-ask spread and price impact ratio.

Accordingly, the results support the adverse selection hypothesis, which suggests that blockholders play a significant role in motivating the chair of the board of directors to monitor management and eventually reduce agency costs. However, existing literature documents that there is a trade-off between market liquidity and control (Bhide 1993; Coffee 1991; Maug 1998). Moreover, with

respect to the real friction of market liquidity, blockholders with greater ownership reduce the firm's trading activity and have a negative impact on trading volume, number of trades, trade size and turnover ratio. Consequently, consistent with trading hypothesis, blockholders are assumed to trade less than outsider shareholders (i.e., institutional investors).

Since there are no previous studies, to the best of the author's knowledge, that have examined the impact of blockholders on market liquidity in the UK capital market, as a result, the findings of the studies have been compared with other US studies. For instance, unlike Brockman et al. (2009), who conclude that, after controlling for this real friction effect, they find no evidence that blockholders have an informational friction effect. In other words, blockholders do not adversely affect bid-ask spread, depths, adverse selection components, or price impact ratio after controlling for the reduction in trading activity. Regarding the real friction of market liquidity, this study reports an insignificantly negative relationship between blockholders and trading volume and turnover ratio. This finding leads us to accept $\boldsymbol{H_3}$, for the FTSE All-Share Index; $\boldsymbol{H_3}$ states that there is a negative relationship between blockholders and market liquidity. This negative effect has also been reported by prior US studies (Brockman et al., 2009; Rubin 2007).

Moreover, this study uses the largest shareholders as another proxy of ownership concentration. This study found that large shareholding is positively correlated with the proportional bid-ask spread and price impact ratio. Furthermore, the findings show a significantly positive relationship between large shareholders and the proportional bid-ask spread. With respect to the price impact ratio, the results suggest an insignificantly positive relationship between large shareholders and price impact ratio. In terms of the information friction effect, the findings suggest that large shareholders have a positive and significant impact on the proportional bid-ask spread but insignificant impact on the price impact ratio. In this regard, it is also evident from the results, that after controlling for the impact of trading activity (i.e., number of trades and trade size), the adverse effect of large shareholders on the bid-ask spread and price impact ratio decreased, but there is still a positive and significant relationship between large shareholders and the bid-ask spread, and insignificant relationship with the price impact ratio. Nevertheless, with respect to real fiction of market liquidity, this study reports insignificantly negative relationship between large shareholders and trade size and turnover ratio. These findings lead us to accept hypothesis $\boldsymbol{H_4}$, for the FTSE All-Share Index; which states that there is a negative relationship between large shareholders and market liquidity. Similar, negative effect is also been reported by prior studies in this area (for

example, Naes 2004; Rubin 2007). In addition, these findings are also consistent with the adverse selection hypothesis.

Table 4.7 Pooled OLS Analysis for measuring the effect of ownership level and concentration on market liquidity for UK firms

Table 4.7 presents results of the effect of ownership level and concentration on market liquidity. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$ .....(1a and 2a)

$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \gamma_4 TZ_{it} + \gamma_5 NT_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$ .....(1b and 2b)

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), industry (IND) and year (YEAR) Dummies. See Table 3.2 for variables' definitions and measurements.

	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**NT**	**TZ**	**VO**	**TR**
Insider Ownership	0.04 (2.56)**	0.03 (2.33)**	0.30 (8.13)***	0.23 (7.16)***	-0.09 (-3.46)***	-0.10 (-4.42)***	-0.22 (-6.42)***	-0.03 (-2.40)**
Institutional Ownership	-0.13 (-2.84)***	-0.05 (-0.41)	-0.56 (-1.98)**	-0.40 (-1.82)*	0.35 (1.34)	0.01 (0.08)	0.47 (1.65)*	0.38 (2.33)**
Large Shareholder	0.06 (2.94)***	0.04 (1.91)*	0.03 (0.81)	0.01 (0.04)	-0.08 (-2.33)**	0.03 (1.26)	-0.07 (-1.81)*	-0.02 (-0.71)
Blockholder	0.05 (2.53)**	0.04 (1.86)*	0.09 (2.21)**	0.05 (1.72)*	-0.08 (-1.94)*	0.01 (0.43)	-0.05 (-1.14)	-0.01 (-0.35)
Market Value	-0.22 (-14.13)***	-0.12 (-9.45)***	-0.47 (-15.21)***	-0.32 (-10.90)***	0.38 (13.23)***	0.07 (4.49)***	0.35 (12.32)***	0.05 (5.05)***
Volatility	0.13 (4.86)***	0.12 (5.07)***	0.11 (1.95)*	0.13 (2.37)**	-0.02 (-0.56)	-0.11 (-3.07)***	-0.04 (-0.84)	-0.13 (-4.61)***
Share Price	-0.10 (-5.34)***	-0.03 (-2.40)**	-0.09 (-2.47)**	-0.11 (-3.48)***	0.17 (5.50)***	0.25 (11.12)***	0.09 (2.51)**	0.01 (0.66)
Trade Size	-	0.10 (5.76)***	-	-0.21 (-5.08)***	-	-	-	-
Number of Trades	-	-0.24 (16.07)***	-	-0.43 (-14.96)***	-	-	-	-
Constant	-1.04 (-10.92)***	-0.99 (-13.91)***	-2.42 (-14.53)***	-2.04 (-15.10)***	0.49 (2.95)***	0.74 (5.97)***	1.08 (5.75)***	-2.68 (-33.67)***
Industry	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Adjusted R^2	**0.47**	**0.58**	**0.42**	**0.51**	**0.41**	**0.38**	**0.32**	**0.17**
Number of Observations	2025	2025	2025	2025	2025	2025	2025	2025

Regarding control variables, this study find a positive and significant relationship between volatility and information friction measures (proportional bid-ask spread and price impact ratio). In particular, this positive relationship is common in the literature, where firms with higher volatility are exposed to higher uncertainty and information asymmetry (Black 1986; French & Roll 1986). However, there is a negative and significant relationship between volatility and real friction

measures (trading volume, trade size, number of trades and turnover ratio). Our results are in line with previous studies (see Poon et al., 2013; Rubin 2007). The coefficient of firm size is negative and significant with information friction of market liquidity (proportional bid-ask spread and price impact ratio). This negative relationship confirms that larger firms have lower information asymmetry and higher market liquidity because they are more able to diversify risk and have quick and greater access to the capital market. Moreover, large firms can deal with unpredicted liquidity problems in a more effective and flexible way than smaller firms can (Konishi & Yasuda 2004). This result is in line with previous studies that have documented similar correlations between firm size and market liquidity (Heflin & Shaw 2000; Kini & Mian 1995). Moreover, Table 4.7 indicates that the share price has a significant effect on market liquidity. Under the OLS estimation, the positive relationship is consistent with the trading hypothesis. For instance, Stoll (2000) reports a positive and significant relationship between share price and market liquidity.

One of the most common tests used to check for the multicollinearity problem is called the variance inflation factor (VIF), which is calculated as follows:

$$\boldsymbol{VIF = \frac{1}{tolerance}} \quad \textbf{(4.2)}$$

Where:

Tolerance = $1-R^2$

R^2 is the coefficient of determination

It has been suggested that, if the VIF exceeds 10, which means that R^2 exceeds 90%, this indicates a multicollinearity problem for those variables in the model using market liquidity as the main dependent variables.

The results of VIF tests indicate that multicollinearity is not a problem in our dataset. From Table 4.8 it is clear that all values are less than 10. Moreover, the average VIF is 1.64 without controlling for the trading activity measures (i.e., number of trades and trade size) and 1.67 when we controlled them. Consequently, these values confirm that our dataset is free from multicollinearity problems.

Table 4.8 Variance Inflation Factors (VIFs) Test

Table 4.8 presents an overview of the maximum variance inflation factors (VIFs) test for all independent variables reported in Table 4.7. The reported VIFs are the maximum VIFs obtained from the regression analyses in STATA 11.

Variance Inflation Factors (VIF) Test								
Insider Ownership	1.14	1.20	1.14	1.20	1.14	1.14	1.14	1.14
Institutional Ownership	1.22	1.28	1.22	1.28	1.22	1.22	1.22	1.22
Large Shareholder	3.24	3.25	3.24	3.25	3.24	3.24	3.24	3.24
Blockholders	2.96	2.96	2.96	2.96	2.96	2.96	2.96	2.96
Market Value	1.24	1.51	1.24	1.51	1.24	1.24	1.24	1.24
Share Price	1.16	1.29	1.16	1.29	1.16	1.16	1.16	1.16
Volatility	1.13	1.14	1.13	1.14	1.13	1.13	1.13	1.13
Number of Trades	-	1.67	-	1.67	-	-	-	-
Trade Size	-	1.36	-	1.36	-	-	-	-
Mean VIF	**1.64**	**1.67**	**1.64**	**1.67**	**1.64**	**1.64**	**1.64**	**1.64**

4.5 Further Analysis and Robustness Checks

This section provides a robustness test to confirm the previous results in the main analysis and to address any potential concerns about our model. To check the robustness of our results, this study first examines the firm size effect on the relationship between ownership level, concentration and market liquidity. Second, this study tests the relationship between ownership level, concentration and market liquidity by adding other control variables such as research and development expenses, firm age and financial leverage, and finally this study applies simultaneous equations – 3SLS – to account for the reverse causality relationship between ownership and market liquidity.

Small Firm versus Large Firm Sample Results

This study divides the data into small and large firms based on their market value of equity and re-examines the relationship between ownership level, concentration and market liquidity. In fact, this check allows us to determine whether the nature of the relationship between market liquidity and ownership level and concentration is different between small and large firms. Small (large) firms are defined as firms that have a market value of equity smaller (equal to or greater) than the median market value of equity for the entire sample of 226 firms. In Table 4.9 Panels A and B, the study reports the pooled OLS year and industry dummies results for large and small firms respectively. With respect to insider ownership, Table 4.8 Panel B reveals that the effect of insider ownership on proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) is stronger and significant for small firms than larger firms. Moreover, insider ownership has a more negative and significant effect on trade size (TZ), turnover ratio (TR) and trading volume (VO). As shown in Table 4.9, Panel A institutional ownership appears to have a positive insignificant relationship on PBAS for

large firms. However, Table 4.9 Panel B reports a negative and significant relationship between institutional ownership and price impact ratio but insignificantly positive relationship with proportional bid-ask spread. Moreover, small firms have a stronger and more significant effect on trade size (TZ), turnover ratio (TR), trading volume (VO) and number of trades (NT) in comparison with large firms. Our findings are in line with Arbel & Strebel (1982), Barry & Brown (1986), Chiang & Venkatesh (1988) and Williams (1986). Regarding blockholders and large shareholders, Table 4.9 Panel A, reveals that for large firms' blockholders and large shareholders have an insignificantly positive relationship with PBAS, in comparison with small firms. Moreover, in case of large firms, blockholders and large shareholders have a negative and insignificant relationship with trade size (TZ) and turnover ratio (TR) in comparison with small firms. In contrast, for small firms Table 4.9 Panel B reveals that blockholders and large shareholders have a positive and significant relationship with proportional bid-ask spread in comparison with large firms. Furthermore, blockholders and large shareholders have a negative and significant relationship with turnover ratio in comparison with large firms. These results are thus in line with previous literature in this area (Kini & Mian 1995; Jacoby & Zheng 2010).

Table 4.9 Pooled OLS Analysis for measuring the effect of firm size on the relationship between market liquidity and ownership level and concentration for UK firms

Table 4.9 presents results the effect of the firm size on the relationship between market liquidity and ownership level and concentration for UK firms. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$$

A brief description of the ownership structure, liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), industry (IND) and year (YEAR) dummies. See Table 3.2 for variables' definitions and measurements.

Model	Intercept	IO	INSO	LS	BKO	VOL	MV	P	Adj.R^2
Panel A Market value of equity> 432.7 million number of observation 1018									
NT	0.76 (3.18)***	-0.10 (-4.01)***	0.34 (1.35)	-0.05 (-1.23)	0.01 (0.08)	0.08 (1.29)	0.52 (10.13)***	0.10 (2.96)***	**0.35**
PBAS	-1.42 (-10.90)***	0.03 (2.18)**	0.01 (0.06)	0.03 (1.40)	0.02 (0.84)	0.10 (2.73)***	-0.27 (-8.97)***	-0.02 (-0.87)	**0.42**
Pimpact	-1.98 (-6.79)***	0.27 (5.43)***	-0.69 (-2.02)**	-0.02 (-0.62)	0.07 (1.40)	-0.07 (-0.92)	-0.76 (-11.12)***	0.15 (3.44)***	**0.42**
TZ	0.01 (0.06)	-0.06 (-2.09)**	0.09 (0.39)	-0.05 (-1.50)	-0.05 (-1.16)	0.14 (2.48)**	0.02 (0.52)	-0.16 (-6.11)***	**0.37**
TR	-2.37 (-20.21)***	-0.01 (-0.70)	0.39 (2.19)**	-0.01 (-0.14)	-0.01 -(0.18)	0.17 (5.04)***	0.01 (0.13)	-0.01 (-0.78)	**0.25**
VO	0.85 (2.78)***	-0.18 (-4.73)***	0.51 (1.44)	0.03 (0.56)	-0.09 (-1.44)	0.08 (1.20)	0.52 (8.78)***	-0.14 (-3.31)***	**0.30**
Panel B Market value of equity< 432.7 million number of observation 1007									
NT	0.55 (2.36)**	-0.05 (-1.46)	0.42 (1.17)	-0.15 (-2.42)**	-0.15 (-2.46)**	-0.03 (-0.62)	0.15 (3.21)***	0.20 (4.76)***	**0.27**
PBAS	-0.99 (-7.45)***	0.04 (1.67)*	-0.26 (-1.23)	0.10 (3.13)***	0.08 (2.57)**	0.13 (3.38)***	-0.07 (-2.93)***	-0.16 (-5.60)***	**0.33**
Pimpact	-2.80 (-12.00)***	0.27 (6.63)***	-0.62 (-1.89)*	0.08 (1.48)	0.10 (1.71)*	0.15 (1.98)*	-0.20 (-4.02)***	0.05 (1.09)	**0.22**
TZ	0.97 (6.07)***	-0.12 (-5.19)***	0.05 (0.27)	-0.03 (-0.83)	-0.07 (-1.76)*	0.09 (1.98)**	-0.02 (-1.05)	-0.30 (-9.34)***	**0.39**
TR	-2.73 (-26.50)***	-0.05 (-2.85)***	0.41 (1.97)**	-0.04 (-1.24)	-0.02 (-0.73)	0.11 (2.75)***	0.03 (1.63)	0.03 (1.43)	**0.12**
VO	1.06 (4.30)***	-0.22 (-5.52)***	0.32 (0.91)	-0.22 (-5.52)***	-0.23 (-4.19)***	0.07 (0.96)	0.21 (4.84)***	-0.04 (-0.88)	**0.21**

Taken together, Table 4.9 shows that the relationship between ownership level, concentration and market liquidity is stronger and more significant for small firms than larger firms. Existing literature has stated that small firms have more information asymmetry between insider and outsider investors, which leads to lower market liquidity (Chiang & Venkatesh 1988; Jacoby & Zheng 2010; Kini & Mian 1995; Williams 1986). In contrast, large firms have a large number of shareholders; as a result, more investors will participate in trading. Consequently, this may dilute the relationship between ownership concentration and market liquidity (Amihud & Mendelson 1986; Jacoby & Zheng 2010).

Inclusion of Additional Control Variables

In the last test, this study controls for more additional variables that may affect market liquidity. The first variable is the research and development expenditures. This study uses a dummy variable to control for the existence of high technology firms where the dummy variable takes a value of one if the firm is from the high technology industry (has spending on research and development expenditures) and zero otherwise. Existing literature has documented that the research and development expenses can be used as a proxy of information asymmetry (Aboody & Lev 2000; Zeckhouser & Pound 1990). In particular, these studies state that firms that have research and development expenses suffer from more information asymmetry and the probability of insider trading from these firms is high. As a result, the study expects to have a positive relationship between the high technology firms and proportional bid-ask spread and Amihud (2002) illiquidity ratio. Moreover, this study controls for the firm age. Theoretically, firms whose stocks have been traded for a long time in the stock market would be more liquid as they have lower information asymmetry between inside and outside investors. Following Sarin et al. (2000), this study measures the firm age as the natural logarithm of the number of years since the firm was founded. Finally, this study controls for financial leverage measured as the percentage of total debt to total capital.

Table 4.10 reports the results after including these variables. The results in Table 4.10 are similar to and consistent with the results obtained in Table 4.7. Nevertheless, it is noticeable that high technology firms are insignificantly positively related with proportional bid-ask spread and price impact illiquidity ratio. In contrast, high technology firms have a significantly negative relationship with the real friction of market liquidity (i.e. number of trades, trade size, turnover ratio and trading volume). These results are in line with previous studies in this area (Aboody & Lev 2000; Zeckhouser & Pound 1990). Regarding the financial leverage, as expected it is positively and significantly related to trading activity measures (i.e., turnover ratio, number of trades, trade size and trading volume) and negatively with proportional bid-ask spread and price impact ratio. This positive effect on market liquidity is consistent with prior empirical papers (Rubin 2007; Sarin et al., 2000). However, financial leverage has a negative and significant impact on proportional bid-ask spread and price impact ratio. This negative relationship may support the argument that debt holders may substitute as a monitoring device (Jensen 1986; Williamson 1988). As can be seen in the results reported in Table 4.10, on average FTSE All-Share firms with more history in the market have an insignificantly negative impact on proportional bid-ask spread and price impact

ratio but an insignificantly positive impact on trading activity in the market (i.e. number of trades , trade size, turnover ratio and trading volume).

Overall, it is noticeable from the results reported in Table 4.10 regarding the effect of insider and institutional ownership and ownership concentration on market liquidity are consistent with the main results reported in Table 4.7. Accordingly, this test confirms that our main results do not suffer from multicollinearity problems. Statistically, Brooks (2008) states that, when multicollinearity exists, the regression model will become very sensitive to any changes in the independent variables and adding or removing any variable will affect the model sharply.

Table 4.10 Pooled OLS analysis on the relationship between ownership level and concentration and Market Liquidity (inclusion of other control variables- Leverage, High technology, and Firm age)

Table 4.10 presents results of the effect of ownership level and concentration on market liquidity. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it+} \gamma_4 Lev_{it} + \gamma_5 HTech_{it} + \gamma_6 FAge_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad \text{(1a and 2a)}$$

$$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it+} + \gamma_4 TZ_{it} + \gamma_5 NT_{it} \gamma_6 Lev_{it} + \gamma_7 HTech_{it} + \gamma_8 FAge_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad \text{(1b and 2b)}$$

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), leverage (Lev), high technology firms (HTech), firm age (FAge), industry (IND) and year (YEAR) dummies. See Table 3.2 for variables' definitions and measurements.

	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**NT**	**TZ**	**VO**	**TR**
Insider Ownership	0.05 (4.61)***	0.03 (3.50)***	0.30 (14.44)***	0.23 (11.93)***	-0.10 (-5.63)***	-0.09 (-7.22)***	-0.23 (-11.38)***	-0.03 (-3.87)***
Institutional Ownership	-0.10 (-1.36)	-0.04 (-0.67)	-0.35 (-2.46)**	-0.24 (-1.84)*	0.23 (1.88)*	0.01 (0.18)	0.36 (2.67)***	0.21 (3.31)***
Large Shareholder	0.21 (2.97)***	0.13 (2.06)**	0.27 (2.06)**	0.16 (1.29)	-0.30 (-2.47)**	0.06 (0.81)	-0.25 (-1.96)**	-0.16 (-2.77)***
Blockholders	0.26 (3.46)***	0.14 (2.03)**	0.20 (1.42)	0.04 (0.31)	-0.45 (-3.45)***	0.15 (1.66)*	-0.31 (-2.30)**	-0.08 (-1.34)
Market Value	-0.22 (-19.83)***	-0.12 (-11.16)***	-0.48 (-21.69)***	-0.32 (-14.42)***	0.39 (19.91)***	-0.07 (-5.10)***	0.36 (2.67)***	0.05 (5.65)***
Volatility	0.13 (5.35)***	0.12 (5.21)***	0.12 (2.41)**	0.13 (2.89)***	-0.02 (-0.58)	0.11 (3.54)***	0.04 (0.95)	0.13 (6.20)***
Share Price	-0.10 (-7.06)***	-0.03 (-2.72)***	0.09 (3.21)***	0.11 (4.10)***	0.16 (6.63)***	-0.24 (-13.78)***	-0.09 (-3.38)***	0.01 (0.70)
Lev	-0.23 (-5.03)***	-0.11 (-2.90)***	-0.41 (-4.76)***	-0.22 (-2.77)***	0.44 (5.70)***	0.02 (0.44)	0.30 (3.64)***	0.21 (5.41)***
FAge	-0.02 (-0.02)	-0.01 (-0.70)	-0.01 (-0.18)	-0.01 (-0.01)	0.03 (0.99)	0.03 (1.49)	0.01 (0.39)	0.02 (1.53)
HTech	0.03 (1.63)	0.01 (0.75)	0.02 (0.66)	0.01 (0.07)	-0.06 (-1.93)*	-0.03 (-1.25)	-0.09 (-2.61)***	-0.04 (-2.87)***
Trade Size	-	0.10 (6.33)***	-	-0.21 (-6.52)***	-	-	-	-
Number of Trades	-	-0.24 (-20.60)***	-	-0.44 (-18.95)***	-	-	-	-
Constant	-1.13 (-12.89)***	-1.06 (-13.43)***	-2.31 (-13.74)***	-1.92 (-12.22)***	0.56 (3.73)***	0.67 (6.30)***	1.02 (6.41)***	-2.75 (-36.26)***
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	**0.46**	**0.57**	**0.41**	**0.51**	**0.41**	**0.37**	**0.32**	**0.17**
Number of Observations	2025	2025	2025	2025	2025	2025	2025	2025

Simultaneous Equations Estimation – 3SLS

The ownership structure literature has documented that ownership variable is endogenously determined (Comerton-Forde & Rydge 2006; Heflin & Shaw 2000; Rubin 2007). Although this study follows Poon et al. (2013) and uses pooled OLS year and industry dummies in order to control for both heterogeneity and simultaneity, it runs the simultaneous equations (3SLS) following Rubin (2007). In particular, this study examines the reverse relationship between market liquidity, blockholders and institutional ownership. For instance, Falkenstein (1996) documents that institutions select large and liquid stock. Hence, market liquidity and institutional ownership may be simultaneously determined; that is, an institutional investor's decision to become a shareholder or a blockholder may depend on the firm's market liquidity. To deal with this concern, this study relies upon the work of Rubin (2007) and adds the following explanatory variables as instruments: volatility, leverage (long-term debt divided by market value of equity), firm age (number of years since the firm first appears on Datastream), and industry classification (ICBIN level 2 code).

Table 4.11 presents the simultaneous equation estimation of the three-step least squares; the two-step procedure yields similar results. To facilitate comparison with other studies, this study presents the most commonly used measures of liquidity, namely, the proportional bid-ask spread, price impact Amihud (2002) illiquidity ratio and trading volume (VO). From Table 4.11 it is noticeable that this study finds that institutional ownership is affected by market liquidity. As can be seen in specifications (2a) and (2b), there is a negative and significant relationship between the bid-ask spread and institutional ownership and insiginificant relationship between institutional ownership and price impact ratio. Nevertheless, the opposite is true with regard to blockholders in specification (3a): the proportional bid-ask spread has a positive and significant effect on blockholdings; in addition to that, specification (3b) shows that institutional blockholdings are positively correlated with the price impact ratio. The rest of the results are consistent in both specifications: institutional ownership has a positive effect on liquidity; institutional blockholdings have a negative effect on market liquidity. The results are in line with the previous US studies (Heflin & Shaw 2000; Rubin 2007).

Furthermore, this study uses the trading volume as a measure for the real friction of market liquidity following Jacoby & Zheng (2010) and Rubin (2007). From specifications (2c) and (3c) it is noticeable that trading volume is affecting institutional ownership positively. However, there is

an insignificantly positive relationship between trading volume and institutional ownership and trading volume. In contrast, there is a negative relationship between trading volume and blockholder. However, insiders' holdings have a positive effect on proportional bid-ask spread and price impact ratio and a negative effect on trading volume. These estimates show that both institutional ownership level and institutional concentration have an effect on market liquidity (Demsetz & Lehn 1985; Denis & Sarin 1999; Gompers & Metrick 2001; Helfin & Shaw 2000). Overall, this study concludes that there is a simultaneous relationship between institutional ownership and blockholder and market liquidity (i.e., price impact ratio, bid-ask spread and trading volume).

Table 4.11 Simultaneous Equation Estimation — 3SLS

Table 4.11 contains coefficient values and t-statistics obtained from the Simultaneous Equation Estimation of the following equations. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$PBAS_{it} = \alpha_0+\beta_1 IO_{it}+ \beta_2 BKO_{it}+ \beta_3 INSO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 P_{it}$ ……1a

$INSO_{it}= \alpha_0+\beta_1 PBAS_{it}+ \beta_2 IO_{it} +\beta_3 BKO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 P_{it}$ 2a

$BKO_{it}= \alpha_0+\beta_1 PBAS_{it}+ \beta_2 INSO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 Lev_{it}+ \gamma_4 FAge_{it} + \sum_{i=1}^{n} IND$ ……3a

$Pimpact_{it} = \alpha_0+\beta_1 IO_{it}+ \beta_2 BKO_{it}+ \beta_3 INSO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 P_{it}$ 1b

$INSO_{it}= \alpha_0+\beta_1 Pimpact_{it} + \beta_2 IO_{it} +\beta_3 BKO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 P_{it}$ ……2b

$BKO_{it}= \alpha_0+\beta_1 Pimpact_{it} + \beta_2 INSO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 Lev_{it}+ \gamma_4 FAge_{it} + \sum_{i=1}^{n} IND$ ……3b

$VO_{it} = \alpha_0+\beta_1 IO_{it}+ \beta_2 BKO_{it}+ \beta_3 INSO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 P_{it}$ ……1c

$INSO_{it}= \alpha_0+\beta_1 VO_{it} + \beta_2 IO_{it} +\beta_3 BKO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 P_{it}$ ……2c

$BKO_{it}= \alpha_0+\beta_1 VO_{it} + \beta_2 INSO_{it}+ \gamma_1 MV_{it} + \gamma_2 VOL_{it} + \gamma_3 Lev_{it}+ \gamma_4 FAge_{it} + \sum_{i=1}^{n} IND$ ……3c

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), proportional bid-ask spread (PBAS), price impact ratio (Pimpact), trading volume (VO), firm size (MV), share price (P), return volatility (VOL), leverage (Lev), firm age (FAge), and industry (IND) dummy. See Table 3.2 for variables' definitions and measurements.

.Dependent	PBAS (1a)	INSO (2a)	BKO (3a)	Pimpact (1b)	INSO (2b)	BKO (3b)	VO (1c)	INSO (2c)	BKO (3c)
PBAS	-	-0.07 (-15.27)***	0.34 (10.45)***	-	-	-	-	-	-
Pimpact	-	-	-	-	-0.01 (-0.46)	0.15 (8.66)***	-	-	-
VO	-	-	-	-	-	-	-	0.01 (0.67)	-0.15 (-8.34)***
IO	0.02 (1.86)*	-0.01 (-3.65)***	-	0.31 (14.59)***	-0.01 (-3.87)***	-	-0.23 (-11.44)***	-0.01 (-4.10)***	-
BKO	0.15 (10.63)***	-0.07 (-21.91)***	-	0.21 (8.07)***	-0.08 (-26.83)***	-	-0.19 (-7.76)***	-0.08 (-26.84)***	-
INSO	-1.36 (-15.19)***	-	-2.92 (-21.95)***	-0.03 (-0.18)	-	-3.42 (-26.44)***	0.07 (0.48)	-	-3.43 (-26.56)***
Market value	-0.22 (-18.44)***	-0.02 (-3.34)***	0.02 (1.48)	-0.50 (-22.56)***	0.01 (2.27)**	0.02 (1.13)	0.39 (18.82)***	0.01 (2.26)**	0.01 (0.41)
Volatility	0.03 (1.30)	0.01 (2.14)**	0.17 (4.51)***	0.16 (3.40)***	0.01 (1.81)*	0.18 (4.69)***	0.05 (1.35)	0.01 (1.76)*	0.21 (5.52)***
Share Price	-0.12 (-7.72)***	-0.01 (-1.45)	-	0.09 (3.40)***	0.01 (2.21)**	-	-0.09 (-3.48)***	0.01 (2.22)**	-
Lev	-	-	-0.15 (-2.39)**	-	-	-0.14 (-2.20)**	-	-	-0.15 (-2.39)**
FAge	-	-	-0.09 (-3.04)***	-	-	-0.11 (-3.36)***	-	-	-0.11 (-3.37)***
Industry dummy	*NO*	*NO*	*YES*	*NO*	*NO*	*YES*	*NO*	*NO*	*YES*

4.6 Summary

Ownership structure of firms has been regarded as one of the most important determinants of market liquidity. The academic literature indicates that insider, institutional and ownership concentration is highly related to market liquidity (Chiang & Venkatesh 1988; Kini & Mian 1995; Rubin 2007). Consequently, this study conducts an extensive investigation on the effect of the ownership level, concentration and market liquidity in the UK over the period 2003-2012. To conduct this analysis, this study employs a pooled OLS year and industry dummy analysis. Throughout the analysis, the study provides empirical evidence that ownership variables are

endogenously determined. The choice of this estimation method, i.e., pooled OLS year and industry dummy, was to alleviate concerns about endogeneity and spurious inferences. Following Poon et al. (2013), this study includes industry fixed effects to control for time-invariant omitted industry-level factors that affect market liquidity. Moreover, this study also includes year effects to control for cross-sectional dependence; that is, market-wide factors that affect market liquidity. Furthermore, this study clusters the errors at the firm level in order to control for time-series dependence. Overall, this study concludes that applying these techniques controls for simultaneity and unobserved heterogeneity as well.

In the main analysis, the result suggests that there is a two-sided relationship between institutional ownership and market liquidity. On the one hand, there is a positive relationship between institutional ownership and market liquidity. On the other hand, the study result concludes that there is a negative relationship between market liquidity and institutional concentration. Moreover, this study reports a negative relationship between insider ownership and market liquidity. Our results are in line with previous studies (Chiang & Venktaesh 1988; Comerton-Forde & Rydge 2006; Rubin 2007).

While previous studies document mixed results regarding the relationship between blockholders and market liquidity, it is not clear how much of the negative correlation between blockholders and market liquidity is due to the adverse selection effect. For instance, after this study controls for the real friction effect of market liquidity (i.e., trading activity), it finds that there is still a positive relationship between blockholders and market liquidity. Our results are not in line with the finding of Brockman et al. (2009), who finds that the relationship between blockholders and bid-ask spread becomes negative after controlling the real friction of market liquidity. Unlike Heflin & Shaw (2000), Kini & Mian (1995), Brockman et al. (2009) and Jacoby & Zheng (2010) who use the ratio of shares held by blockholdings as the sole dimension of ownership concentration, this study uses also the largest shareholder (top five institutional shareholder) to measure the ownership concentration along with blockholders. With respect to large shareholders, this study finds that there is a negative relationship between them and market liquidity. Moreover, after this study controls for the real friction effect of market liquidity (i.e., trading activity), it finds that there is still a positive relationship between large shareholders and market liquidity. These results are robust after controlling for the firm's size effect and adding other control variables such as research

and development expenses, leverage and firm age and applying different sensitivity specification tests. The next chapter investigates the relationship between owners' identity and market liquidity.

Chapter 5

The Impact of the Owners' Identity on Market Liquidity

5.1 Introduction

The last two decades have witnessed that large institutional investors are perceived to be important players in listed firms. A vast body of research has documented that large institutional investors prefer to invest in firms with superior past financial performance, lower return volatility, higher market liquidity, larger firms' size, and longer listing history (e.g. Badrinath et al., 1989; Falkenstein 1996; Lakonishok et al., 1992). For instance, Ferreira & Matos (2008) find that institutional investors prefer large and liquid stocks with good corporate governance practice, especially in countries where country-level investor protection and quality of institutions are weak. For example, in the UK Hussain (2000) finds that institutional blockholders prefer smaller firms and firms with lower ownership concentration.

In the existing literature, several studies have concentrated on the relationship between institutional blockholders and market liquidity (Barabanov & McNamara 2002; Naes 2004; Poon et al., 2013). However, most of these studies have largely ignored the effect of the identity of institutional blockholders on market liquidity. Given the rise in the size of institutional equity positions around the world the relationship between the identity institutional blockholders and market liquidity is a widely debated issue. For example, the Office of National Statistics (2012) reports that the average equity position owned by UK institutional investors increased from 29% in 1963 to 56.2% in 2012. Some scholars argue that different identities of shareholders, specifically institutional investors may have different incentives and costs associated with monitoring in comparison with non-institutional owners (Barabanov & McNamara 2002; Naes 2004). However, the results of these studies on the direction of causality of the relationship between the identity of institutional blockholders and market liquidity are mixed and inconclusive. For example, in the US Barabanov & McNamara (2002) conclude that independent investment advisors, investment companies and bank's investors have stronger positive impact on bid-ask spread relative to insurance companies' investors. However, Naes (2004) documents a negative relationship between non-financial company owners and bid-ask spread for a sample of companies from the Norwegian Stock Market.

However, some other recent studies have focused on investigating the effect of foreign ownership on market liquidity. For instance, Rhee & Wang (2009) find a negative relationship between foreign ownership and market liquidity in Indonesia. In contrast, Choi et al. (2013) find that foreign investors have a significant and positive impact on bid-ask spread in China. Keeping in mind, these contrasting results about two different countries and other gaps in relevant literature this study investigate this issue in the context of the UK. Therefore, in chapter 4 this study tested the impact of institutional blockholder on market liquidity. In chapter 5 here, it tests the effect of the identity of institutional blockholders and non-institutional blockholders separately on market liquidity in the UK.

The second important issue that this study addresses is whether the identity of directors' ownership affects market liquidity. In recent years, regulators have increasingly emphasised the importance of disclosing the ownership held by non-executive as well as executive directors. In this regard, the Higgs Report (2003) recommended the inclusion of more independent non-executive directors in companies' boards in the UK. Previous studies test the relationship between the managerial ownership and market liquidity (Comerton-Forde & Rydge 2006; Heflin & Shaw 2000; Naes 2004). Nevertheless, few studies have questioned the insiders' identity impact on market liquidity and have increasingly emphasised on the importance of subdividing the directors' ownership into internal and external directors or insider manager and non-manager (Fidrmuc et al., 2006; Heflin & Shaw 2000). Theoretically, Seyhun (1986) states that directors who are familiar with the day-to-day operations of the company trade on the basis of more valuable information. Therefore, this study first tested the relationship between market liquidity and the total directors' ownership, in chapter 4. Then, in chapter 5 here, this study divides the board of director's ownership into executive and non-executive to assess whether a relationship exists for each group separately.

This chapter thus aims to provide empirical evidence on the relationship between the owners' identity and market liquidity in UK public firms. The motivation for this investigation is based upon the *information hierarchy hypothesis's* which document that different investors have different ability to access the firm's private information, which affects market liquidity. The rest of the chapter proceeds as follows. Section 5.2 provides information about hypothesis development. The descriptive statistics on owners' identity are presented in section 5.3. Section 5.4 provides results of the empirical analysis for UK public firms. Section 5.5 provides information about the robustness check of the main results. Finally, section 5.6 concludes the chapter and provides a brief summary of the overall content of the chapter.

5.2 Hypothesis Development

This section provides a detailed discussion on the formulation of the study hypotheses relevant to issues raised this chapter. In order to investigate the effect of owners' identity and market liquidity in the UK market all these testable hypotheses have been developed and explained. The development of the research hypotheses are theoretically based on the trading and adverse selection hypotheses.

5.2.1 The Separate Effects of Executive and Non-Executive directors' Ownership on Market Liquidity

While examining the the effect of directors' identity on market liquidity, most studies refer to the information hierarchy hypothesis, which states that "*those directors who are more familiar with the day-to-day operations of the company trade on more information that is valuable"* (Fidrmuc et al., 2006, p. 9). This study differentiates between two categories of director's ownership: executive directors (the percentage of ordinary shares owned by directors who are executive), and non-executives (the percentage of shares owned by non-executives). This study lists the insider's identity in decreasing order with respect to the degree of information superiority they are assumed to acquire. On average, there are two types of directors of a UK firm: executive and non-executive directors. This study tests the information hierarchy hypothesis with market liquidity.

In particular, Seyhun (1986) reveals that there is an information hierarchy hypothesis, which postulates that the information content of the transactions depends on the identity of the director who trades. According to this hypothesis, directors who are familiar with the day-to-day operations of the company trade on information that is more valuable. Moreover, Jeng et al. (1999 p. 32) question whether insiders can benefit from their information advantage: "*Some insiders are more 'inside' than others"*. For instance, executive directors are likely to have better information about the firm's prospects than non-executive directors are. Specifically, the earlier support of the information hierarchy hypothesis by Seyhun (1986) and Lin & Howe (1990) may have been generated by transaction size. In these studies, CEOs' trades are twice as large, on average, as those by other officers or directors, and larger transactions trigger stronger price reactions.

To the best of the author's knowledge, only three previous studies have investigated the effect of directors' identity on market liquidity. In US data, Heflin & Shaw (2000) find that the managerial ownership has a negative impact on market liquidity. In the same spirit, from the Norwegian equity market Naes (2004) documents that primary insider (board of directors and manager) has a negative impact on market liquidity. On the other hand, in ASE Comerton-Forde & Rydge (2006) find that the director holding up to 10% enhances market liquidity; they suggest that the monitoring benefits of inside holdings may be offset by entrenchment concerns at level of trading in the stock. Insider holdings greater than 10% have a negative impact on market liquidity. As a result, this study proposes that:

Hypothesis 1a*: There is a negative relationship between executive ownership and market liquidity.*

Hypothesis 1b*: There is a negative relationship between non-executive ownership and market liquidity.*

5.2.2 Outsider Owners' Identity and Market Liquidity

A vast body of literature has documented that ***pension funds*** have a strong motivations to involve in monitoring processes (Cremers & Nair 2005; Dittmar & Mahrt-Smith 2007; Officer 2007). In particular, these studies document that pension fund's shareholders utilise their strength of shareholder monitoring as internal corporate governance mechanism. Existing literature implies that firms with larger public pension fund ownership are more likely to be monitored by them, leading to superior performance in the future; however, this may lead to a reduction in market liquidity (Barber 2006; Romano 1993).

Moreover, a vast body of literature has documented that pension fund ownership may have strong motivations to create value for their shareholders and actively monitor management (La Porta et al. 2000). However, monitoring may come at a cost such as the extraction of private benefits. As the largest owner, pension companies may operate the extent of disclosure to maximise private benefits such as changes in the market value of shares (Makhija & Patton 2004). As blockholdings have been linked to higher information asymmetries, which reduces market liquidity (Ginglinger & Hamon 2012; Sarin et al., 2000), in the same spirit, pension fund ownership may reduce market liquidity. This study proposes that:

Hypothesis 2*: There is a negative relationship between the proportion of shares owned by pension fund companies and the market liquidity.*

Furthermore, extant literature has documented that ***foreign investors*** have a positive impact on market liquidity. This is due to the fact that foreign institutional investors are perceived to be better traders given that they are better informed (Grinblatt & Keloharju 2004 ; Seasholes 2004); they monitor corporate management better than local institutions (Khanna & Palepu 2000) and they produce more timely and accurate forecasts than local analysts (Bacmann & Bolliger 2001). Moreover, foreign investors show a preference for large firms with low insider ownership, stocks that are associated with lower information asymmetry (Bushee & Noe 2000; Ferreira & Matos 2008), liquidity and international presence (Dahlquist & Robertson 2001). Therefore, foreign investors contribute to market liquidity. However, since they are geographically separated from the firm, foreign investors may get more information, interfere with the firm's operations/business, and collect private information and may decrease market liquidity (Choe et al., 2005; Huang & Shiu 2005; Seasholes 2004).

However, some studies have stated that there is a positive relationship between foreign ownership and market liquidity (Seasholes 2004). Foreign institutions will exert pressure on firms to increase disclosure. Increased disclosure reduces information asymmetries between insider and outsider investors and increases market liquidity (Diamond & Verrachia 1991, Heflin et al., 2005). Foreign blockholders are linked to increase in firm investment (Cronqvist & Fahlenbrach 2008), and prevent earnings manipulation (Farber 2005). As a result, the actions of foreign holding companies will donate to a liquid market. This study proposes that:

Hypothesis 3a*: There is a positive relationship between the proportion of shares owned by foreign companies and the market liquidity.*

Hypothesis 3b*: There is a negative relationship between the proportion of shares owned by foreign companies and the market liquidity.*

With respect to ***bank ownership***, existing literature has stated that bank's investors have a comparative advantage in access to inside information about the firm (Fama 1985; James 1987). Moreover, bank ownership can reduce agency costs and let investors to monitor management more effectively (Hoshi et al., 1990; Prowse 1990). Due to their closer participation in the day-to-day activities of the firm, commercial banks may have cheaper and better access than other institutional investors to information for monitoring the firm's investment policy. Moreover, Gatev & Strahan (2006) argue that, in contrast to other institutions, banks have a unique ability to trade against market-wide liquidity shocks because they experience funding flows and costs that are negatively

related with market liquidity. This gives banks a unique ability to hedge against market-wide liquidity shocks. Therefore, ownership by banks could decrease the liquidity risk of stocks. In contrast to other institutional investors, commercial banks have funding flows that are negatively correlated with market liquidity. This study proposes that:

Hypothesis 4*: There is a negative relationship between the proportion of shares owned by investment banks and the market liquidity.*

Regarding ***government ownership***, existing literature has stated that agency costs are likely to be high in government firms as there are no active shareholders acting as monitors. Moreover, the owners (citizens) have little or no corporate governance mechanisms to influence how managers run the firm. This suggests that the information environment of government-owned firms is more opaque and liquidity is thus expected to be lower (Brockman & Chung 2003). In some countries, the state may be a significant corporate stockholder. When the state is a major owner, it is especially important for the board of directors to appear to be legitimate and accountable to the public. This can be achieved by adding more outside directors to the board. This study proposes that:

Hypothesis 5*: There is a negative relationship between the proportion of shares owned by government and the market liquidity.*

With respect to ***free float shares,*** many studies have documented that there is a negative relation between ownership concentration and free float shares in the market. For instance, Demsetz (1968) states that there is a positive relationship between number of shareholders and market liquidity. Moreover, Holmstrom & Tirole (1993) argue that dispersed shareholders have fewer incentives for information production if the float on a stock is smaller. Furthermore, Bhide (1993) argues that large holdings by active stockholders will reduce the float of stock that is free to trade. Ginglinger & Hamon (2007) conclude that there is a positive relationship between free float and market liquidity. This study proposes that:

Hypothesis 6*: There is a positive relationship between the proportion of shares owned by free float shareholders and market liquidity.*

With respect to employee ownership, cross- holding and other holding relationship with market liquidity, to the best of the author's knowledge only a limited number of studies test this relationship with market liquidity (see Park 2009, for more details). However, based on the work of Park (2009) this study expects to find a negative relationship between employee ownership, cross-holding and other holding and market liquidity.

5.3. Descriptive Analysis

This section presents the descriptive statistics for owners' identity variables. Table 5.1 uses mean, median, standard deviation, maximum, minimum, percentiles, skewness and kurtosis values to describe the data over the period 2003-2012. In addition, Table 5.2 presents the breakdown of ownership identity variables according to the industry. The mean is provided for nine industries within the FTSE All-Share Index. In the last part in this section, Table 5.3 reports the mean and median differences for owners' identity and market liquidity variables in large and small firms. It is noticeable from Table 5.1 that executive director's ownership (EO) ranges between a minimum of zero to a maximum of 59.6% with an average of 7.6% and a standard deviation of 16.21% for the whole sample over the period. With respect to non-executive director's ownership (NEO) the average of non-executive director's ownership within the same period of study is 3.09% with a standard deviation of 8.9%. Our results are in line with previous UK studies (see Florackis & Ozkan 2009; Geiler & Renneboog 2014; Khurshed et al. 2011; Ozkan 2007 for more details).

As shown in Table 5.1, after winsorisation of ownership's identity variables, this study notices that foreign ownership (NOSHFR) ranges between a minimum of zero to a maximum of 77% with an average of 7.5 % for the whole sample over the period. In addition, investment company ownership (NOSHIC) has an average of 24%, and other holding (NOSHOF) has an average of 0.83% with ranges between zero and 68%. With respect to pension fund holding (NOSHPF), Table 5.1 shows that NOSHPF has an average of 1.71% with a range of zero and 70%. However, government ownership (NOSHGV) has an average of 0.1% and range between zero and 26%. Regarding employee ownership (NOSHEM) it has an average of 12.5% and a range between zero and 99%. It is noticeable from Table 5.1 that cross- holding (NOSHCO) has an average of 8.6% and ranges between 96% and zero. These findings are consistent with the results of prior UK ownership-liquidity studies (Park 2009) and the cross- country studies (Ng et al. 2011). Nevertheless, to the

best of the author's knowledge only two studies investigate the effect of institutional identity on market liquidity.

Our results matched the findings of Park (2009) in UK. In contrast, Poon et al. (2013) document that the composition of institutional ownership in the US is different than the UK. For example, the investment companies hold 14% whereas in the UK 24%, other holding hold in the US 0.1% relative to 0.8% in the UK. These figures are in the line with the findings of (Short & Keasey 1999). Furthermore, the descriptive statistics in Table 5.1 shows that the skewness and kurtosis's figures reveal that most of the variables are not normally distributed. For instance, the data is considered to be normally distributed if the skewness value is ±1.96 and the kurtosis value is within ±3 (Haniffa & Hudaib 2006). In order to overcome this problem this study transforms all the study's variables by using the natural logarithm following the previous studies (Park 2009; Poon et al., 2013).

Table 5.1 Descriptive Statistics of the whole Sample

Table 5.1 presents the time series average of cross-sectional means, medians, standard deviations, maximum, minimum, percentiles, skewness and kurtosis during the sample periods from December 2002 to December 2012 for FTSE ALL SHARE companies.

A brief description of the variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment companies holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO) and other holding (NOSHOF). See Table 3.2 for variables' definition and measurements.

	MEAN	MEDIAN	STDEV	MAX	MIN	25 p	75 p	Skewness	Kurtosis
EO	0.0763	0.0066	0.1621	0.596	0.0002	0.0025	0.0479	2.45	7.58
NEO	0.0309	0.0025	0.0893	0.3976	0.0000	0.0005	0.0079	3.65	14.98
NOSHCO	0.0866	0.01	0.1684	0.9666	0.0000	0.0025	0.0666	2.69	10.17
NOSHEM	0.1259	0.0266	0.2063	0.9966	0.0000	0.0066	0.0966	2.01	6.48
NOSHGV	0.0011	0.0000	0.0113	0.26	0.0000	0.0000	0.0000	18.54	402.19
NOSHIC	0.2400	0.2233	0.2264	0.9966	0.0000	0.0533	0.3500	1.14	3.84
NOSHPF	0.0171	0.0066	0.0326	0.7050	0.0000	0.0050	0.0266	11.94	231.33
NOSHFF	0.7195	0.7658	0.1846	0.9443	0.2529	0.55	0.885	-0.40	1.75
NOSHOF	0.0083	0.0000	0.0604	0.6800	0.0000	0.0000	0.0000	8.91	87.54
NOSHFR	0.0754	0.0000	0.1263	0.7700	0.0000	0.0000	0.1000	2.57	10.53

The results from the pool sample for all firm years discussed above. However, it is interesting to investigate the differences in owners' identity with different characteristics among the different industries. Table 5.2 represents the mean of owners' identity variables accounting for differences in

industry sectors for all firms in the sample. In terms of executive ownership (EO), the oil and gas firms seem to have the largest percentage of holding (i.e. 15%) compared with those in different sectors (in comparison only 1% of utilities firms are found to hold executive ownership). However, industrial, consumer services, and telecommunication companies have similar means (i.e., 8%) and are close to the average of the pool sample. On the other hand, for non-executive ownership telecommunication firms are found the largest percentage of holding that is, around 7 % of telecommunication firms hold by non- executive directors, whereas 0% of the utility firms hold by non-executive ownership. For instance, utilities firms are found to be less compliant with the regulatory requirement in terms of the appointment process associated with non-executive ownership according to Higgs review (2003).

With respect to the investment company holding (NOSHCO), Table 5.2 shows that 14% of basic materials firms hold by NOSHCO. In contrast, the utilities sector seems to be the least holder of NOSHCO with an average of 0%. It is noticeable from Table 5.2 that in terms of employee ownership (NOSHEM) oil and gas companies has the highest percentage of holding that is 17%. Whereas, the utilities firms have the lowest percentage of 1%, with respect to government ownership (NOSHGV), as shown in Table 5.2 all the industry has the same percentage of holding with an average of 0%. Regarding investment companies (NOSHIC), technology companies have the highest investment company ownership with an average of 32%. In contrast, utility's firms have the lowest investment company ownership with an average of 15%. Finally, with respect to free float shares (NOSHFF), utilities firms have the higher percentage of holding with an average of 83%.

Regarding pension fund ownership (NOSHPF), consumer goods and telecommunication companies have the lowest pension fund ownership with an average of 0%. In contrast, all the remaining sectors hold 1% of pension funds. Furthermore, Table 5.2 shows that in terms of foreign ownership (NOSHFR) basic materials companies have the highest percentage of 13%. In contrast, the lowest percentage is in utilities firms with an average of 1%. Regarding other holding (NOSHOF), consumer goods have the highest percentage with an average percentage portion of 3% whereas basic materials firms holds a percentage portion of 1%. In contrast, other remaining sectors have an average percentage portion of 0%.

To sum up, this study finds that utilities companies have the lowest percentage of holding for EO, NEO, NOSHCO, NOSHCO, NOSHEM, NOSHIC, NOSHPF, NOSHFR, whereas utilities

companies have the higher NOSHFF in comparison with other industries, mainly the telecommunication, technology, basic materials and oil and gas firms. Recalling our findings from Chapter 4 Table 4.2, utilities companies have the lowest proportional bid-ask spread and price impact ratio. Nevertheless, telecommunication and technology companies have the highest Pimpact ratio. Moreover, technological firms have the lowest number of trades and trading volume. Consequently, from the above results this study strongly recommends controlling for the industry effect following recent studies in this area such as Poon et al. (2013).

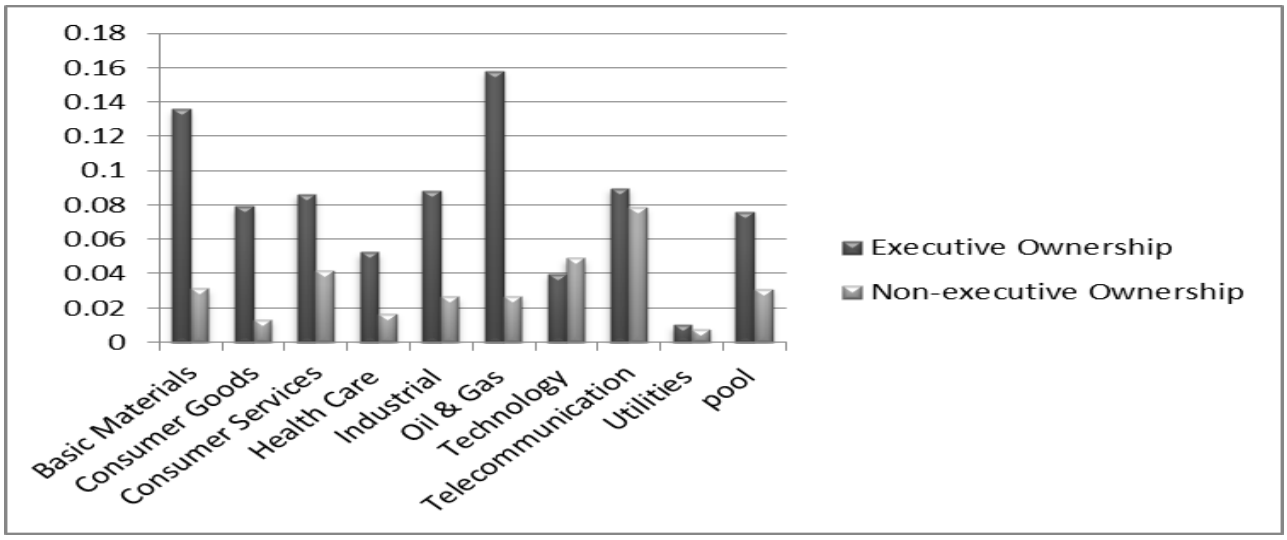

Figure 5.1 Insider Ownership Identities Accounting for Differences in Industry Sectors

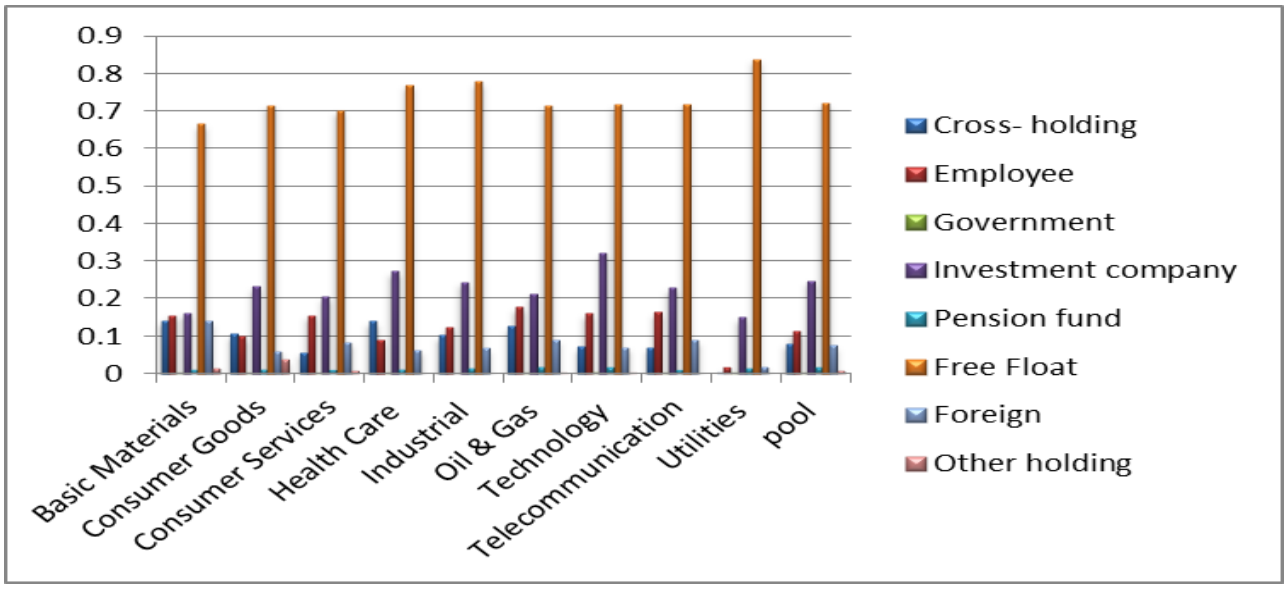

Figure 5.2 Outsider Ownership Identities Accounting for Differences in Industry Sector

Table 5.2 Means of the owners' identities accounting for Differences in Industry Sectors and Pool Sample of 2003- 2012

Table 5.2 presents the average of ownership structure variables according to the industry classification for the years 2003 to 2012. For ownership structure, this study uses executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment companies holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO) and other holding (NOSHOF).

Industry	EO	NEO	NOSHCO	NOSHEM	NOSHIC	NOSHPF	NOSHFF	NOSHFR	NOSHGV	NOSHOF
Basic Materials	0.13	0.03	0.14	0.15	0.16	0.01	**0.66**	**0.13**	0.00	**0.01**
Consumer Goods	0.07	0.01	0.10	0.09	0.23	0.01	0.71	0.05	0.00	**0.03**
Consumer Services	0.08	0.04	0.05	0.15	0.20	0.00	0.70	0.08	0.00	0.00
Health Care	0.05	0.01	0.13	0.09	0.27	0.01	0.77	0.06	0.00	0.00
Industrial	0.08	0.02	0.10	0.12	0.24	0.01	0.77	0.06	0.00	0.00
Oil & Gas	**0.15**	0.02	0.12	**0.17**	0.21	0.01	0.71	0.08	0.00	0.00
Technology	0.03	0.04	0.07	0.16	**0.32**	0.01	0.71	0.07	0.00	0.00
Telecommunication	0.08	**0.07**	0.06	0.16	0.22	0.00	0.71	0.08	0.00	0.00
Utilities	**0.01**	**0.00**	**0.00**	**0.01**	0.15	0.01	**0.83**	**0.01**	0.00	0.00
pool	0.07	0.03	0.07	0.11	0.24	0.01	0.71	0.07	0.00	0.00

Firm Size Effect

To study the effect of the firm size on the owners' identity and market liquidity variables, this study stratifies UK firms into two size groups. The large (small) firm group includes firms with size above (below) the median of the market value of equity (MV) of the UK sample firms. The means, median and standard deviation for owners' identity and market liquidity variables are reported in Table 5.3. This study implies both parametric and non-parametric test in order to test the differences in means and median of the above-mentioned variables between small and large UK firms; both the t-statistics and Wilcoxon signed-rank test are used to test the mean and median differences respectively. Table 5.3 reports that on average small UK firms have a lower number of trades, trade size, turnover ratio, and sterling pound trading volume relative to the large UK firms.

Nevertheless, it is noticeable from Table 5.3 that small UK firms have the higher proportional bid-ask spread (PBAS) and price impact Amihud (2002) illiquidity ratio (Pimpact) in comparison with the large UK firms. All the figures are significant at (1% level). With respect to the owners' identity variables, small UK firms have higher executive and non-executive ownership in comparison with large UK firms. These finding are in line with previous studies (Jacoby & Zheng 2010; Kini & Mian 1995; Williams 1986). These studies document that small firms have more information asymmetry between firms and market than large firms. Existing literature has documented that the relationship between insider ownership (executive and non-executive

ownership) and quoted bid-ask spread is more significant and stronger than for large firms. Specifically, smaller firms have a smaller number of insiders, which gives them more ability to access private information about a firm's prospect than outside investors (i.e., institutional investors), which leads to lower market liquidity (Jacoby & Zheng 2010; Kini & Mian 1995).

Nevertheless, as shown in Table 5.3, larger UK firms have more float shares (NOSHFF) than small firms. This is in line with previous studies (Chiang & Venkatesh 1988; Jacoby & Zheng 2010; Kini & Mian 1995; Tinic 1972). These studies have stated that larger firms are more dispersed; in other words, they have more shareholders. In particular, these studies conclude that, when the ownership is held by outsider shareholders, this will increase the probability that more investors will participate in the trading operation in the capital market; this leads to an increase in the market liquidity. However, with respect to the identity of institutional investors, it is noticeable from Table 5.3 that small firms have more cross-holding (NOSHCO), employee holding (NOSHEM), investment company holding (NOSHIC), and pension fund holding (NOSHPF). In contrast, larger firms have more government ownership (NOSHGV), foreign companies (NOSHFR), and other holdings (i.e., endowment and education institutions) (NOSHOF) relative to small firms. As a result, Table 5.3 shows that the government ownership and foreign investors prefer to invest in larger firms that have lower information asymmetry and higher market liquidity. Our results are in line with previous UK studies (Park 2009)

Overall, this study notices from Table 5.3 that small firms have more executive and non-executive ownership, which leads to more total liquidity costs (i.e., proportional bid-ask spread and price impact ratio) and lower real friction of market liquidity (i.e., turnover ratio, number of trades, trade size and trading volume) in comparison with large firms. Moreover, recent studies have suggested the firm's size effect as a robustness and consistency test to detect if the firm's size has an effect on the relationship between ownership structure and market liquidity (see Jacoby & Zheng 2010; Kini & Mian 1995). This study notices from Table 5.3 that the firm's size has on average a strong and significant effect (at 1% significant level) on both market liquidity and owners' identity variables. Consequently, the study tests the effect of firm size on the relationship between owners' identity and market liquidity as a further test to check the consistency of the results of firm's size effect with the main results, as we will see later in this chapter.

Table 5.3 Descriptive Statistics of Large and Small Firms

Table 5.3 presents the mean and median differences of executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), and number of trades (NT). Firms are sorted according to the market value: firms above the median of market value are classified as large and those below the median are classified as small. See Table 3.2 for variables' definition and measurements.

	Large Firms			Small Firms				
Variables	**Mean**	**Median**	**Standard deviation**	**Mean**	**Median**	**Standard deviation**	**t-statistics**	**Wilcoxon signed-rank test**
VO	3899.48	793.09	7376.39	988.88	255.65	2912.67	12.04***	16.35***
PBAS	0.0072	0.0037	0.0147	0.0263	0.0208	0.0265	-20.31***	-19.53***
NT	1090.49	444.98	1640.31	252.37	45.68	575.69	15.69***	17.75***
TR	0.0080	0.0050	0.0125	0.0063	0.0039	0.0102	3.52***	7.22***
TZ	3.962	2.336	7.221	8.55	3.84	18.63	-7.33***	-10.04***
PIMPACT	0.0001	5.74e-06	0.0002	0.0003	0.0001	0.0007	-9.83***	-18.64***
EO	0.0649	0.0059	0.1525	0.0868	0.0076	0.1689	-3.09***	-3.70***
NEO	0.0262	0.0020	0.0848	0.0356	0.0034	0.0939	-2.70***	-5.75***
NOSHCO	0.0782	0.0096	0.1499	0.0956	0.02	0.1853	-2.76***	-2.75***
NOSHEM	0.1032	0.02	0.1803	0.1467	0.0333	0.2264	-4.99***	-3.83***
NOSHGV	0.0015	0.0000	0.0149	0.0001	0.0000	0.0060	1.52	-4.10***
NOSHIC	0.2202	0.0946	0.2289	0.2600	0.2435	0.2233	-4.17***	-4.46***
NOSHPF	0.0142	0.0058	0.0186	0.0203	0.0075	0.0428	-2.46**	0.57
NOSHFF	0.7514	0.8229	0.1843	0.6892	0.7062	0.1798	7.53***	7.31***
NOSHFR	0.0756	0.0100	0.1226	0.0752	0.0000	0.1301	0.12	1.33
NOSHOF	0.0097	0.0000	0.0634	0.0069	0.0000	0.0574	1.06	2.02**

*****,**,* represent significance at the 1%, 5% and 10% levels respectively.**

Correlation Matrix

This section presents and discusses the Pairwise correlations among the owners' identity, market liquidity proxies and control variables. The correlation coefficients are tested for the existence of high collinearity among independent variables. The term collinearity indicates that two predictors have a near perfect linear relationship. The importance of detecting such a problem is that the regression model estimates of the coefficients become unstable as the level of multicollinearity increases. Statistically, it is suggested that multicollinearity may damage or threaten the regression analysis if the degree of correlation exceeds 80% (Gujarati 2003; Hair et al., 1998). Therefore, this percentage is adopted as the threshold in this study to detect the presence of the problem of multicollinearity in the residuals.

It is noticeable from Table 5.4 that most of the correlation coefficients between the study's variables are low but there are still some relatively high correlations between some of those

variables. The correlation coefficient can be explained as follows. From Table 5.4 it is noticeable that the highest correlation, compared with other variables, is found between the proportional bid-ask spread (PBAS) and number of trades (NT), which is (-0.63), PBAS and market value (MV) is (-0.50), price impact ratio (PIMPACT) and NT is (-0.53), PIMPACT and MV is (-0.53) and NT and MV is (0.52). However, our models do not suffer from multicollinearity. According to Brooks (2008), when the correlation coefficient between the variables is high, it could indicate near multicollinearity. This near multicollinearity will make the standard error of the variables high, which will make those variables insignificant. Another problem with multicollinearity is that the regression model will become very sensitive to any changes in the independent variables and adding or removing any variable will affect the model sharply. So, the coefficient and the significance of the other variable will be changed if we add or drop any variable to or from the model. That will make the parameter estimates very wide and lead to inappropriate conclusions. However, Brooks (2008) suggests a number of solutions to the problem; the first solution is to ignore it, especially if the variables' coefficients have the correct sign and magnitude value. The second solution is to drop one of the collinear variables; unfortunately, sometimes the variables with high correlations are important for explaining the dependent variable, so this study cannot drop any of them. The third solution is to transform the highly correlated variables into a ratio; this may be unacceptable, especially as the theory suggests that the relationship should be a certain nature that does not include the variable as a ratio**.**

Nevertheless, in order to detect the problem of multicollinearity in the esimations this study calculates the variance inflation factor (VIF) test, where the variance factors of each variable is calculated. Under the guidelines of this test, the existence of multicollinearity can be confirmed only in circumstances where the value of the variance inflation factor is more than 10. Both the VIF test and the pairwise rank correlation confirm that there is no intercorrelation among the study's independent variables in our models. Moreover, this study also estimates robust standard error to control for serial correlation and heteroscedasticity using the option "Robust" in STATA 11.

Table 5.4 Correlation Matrix for the Research Variables

This 5.4 presents correlations between the variables used in the study. A brief description of all the variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), and number of trades (NT). See Table 3.2 for variables' definitions and measurements.

	NOSHCO	NOSHEM	NOSHGV	NOSHIC	NOSHPF	NOSHFF	NOSHFR	NOSHOF	EO	NEO	PBAS	PIMPACT	NT	TR	TZ	VO	MV	VOL	p
NOSHCO	1.00																		
NOSHEM	0.22*	1.00																	
NOSHGV	0.02	-0.05*	1.00																
NOSHIC	-0.06*	-0.08*	0.02	1.00															
NOSHPF	0.02	-0.02	0.09*	0.22*	1.00														
NOSHFF	-0.17*	-0.29*	0.05*	-0.17*	0.03*	1.00													
NOSHFR	0.14*	0.03*	0.05*	0.06*	0.05*	-0.14*	1.00												
NOSHOF	0.08*	0.06*	0.01	-0.09*	0.02	-0.15*	0.09*	1.00											
EO	-0.01	0.15*	-0.04*	-0.01	-0.06*	-0.10*	-0.03	0.05*	1.00										
NEO	0.02	0.11*	-0.12*	0.01	-0.06*	-0.09*	0.00	0.05*	0.30*	1.00									
PBAS	0.04	0.13*	-0.16*	0.16*	-0.01*	-0.35*	-0.04*	0.04	0.05*	0.21*	1.00								
Pimpact	0.04*	0.14*	-0.14*	0.07*	-0.01*	-0.20*	-0.02	-0.02	0.28*	0.35*	0.48*	1.00							
NT	-0.05*	-0.14*	0.15*	-0.16*	0.01	0.34*	-0.05*	0.03	-0.12*	-0.21*	-0.63*	-0.53*	1.00						
TR	-0.07*	-0.07*	0.09*	0.04*	-0.02	0.03*	-0.03*	-0.02	-0.09*	-0.14*	-0.17*	-0.35*	0.25*	1.00					
TZ	0.05*	0.06*	-0.05*	0.11*	-0.00	-0.27*	-0.03*	-0.02	-0.18*	-0.09*	0.42*	-0.03*	-0.38*	0.06*	1.00				
VO	-0.03	-0.10*	0.09*	-0.08*	-0.01	0.18*	0.01	0.06*	-0.21*	-0.30*	-0.40*	-0.64*	0.48*	0.34*	0.05*	1.00			
MV	-0.05	-0.13*	0.09*	-0.13*	0.05*	0.23*	0.01	0.06*	-0.06*	-0.16*	**-0.50***	**-0.53***	**0.52***	0.16*	-0.22*	0.45*	1.00		
VOL	0.09*	0.12*	-0.05*	0.02	-0.08*	-0.13*	0.06*	-0.05*	-0.02	0.07*	0.22*	0.24*	-0.16*	0.03	0.05*	-0.15*	-0.30*	1.00	
P	-0.06*	-0.08*	-0.00	-0.07*	-0.00	0.13*	-0.01	0.05*	0.16*	0.10*	-0.28*	-0.05*	0.27*	0.04*	-0.41*	0.01	0.28*	-0.21*	1.00

*Represent significance at 5% level or better.

5.4 Empirical Results and Analysis

The Effect of the Owners' Identity on Market Liquidity

This study conducts several method of estimation in order to measure the relationship between owners' identity and market liquidity such as untabulated results of fixed and random regression. Unlike other previous studies, this study follows Poon et al. (2013), and employs pooled OLS dummy industry and year in order to control for endogeneity and time invariant problems. The following model is used to examine this relationship:

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}$$
$$+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5.1)$$

Where *LIQ* is market liquidity, *EO* is the executive ownership, *NEO* is the non-executive ownership, *NOSHFF* is free float shares, *NOSHIC* investment company ownership, *NOSHPF* pension fund ownership, *NOSHGV* government ownership, *NOSHEM* employee ownership, *NOSHCO* cross-holding ownership, *NOSHFR* foreign ownership, *NOSHOF* other holding, *MV* is market value, *P* is shares price, *VOL* is volatility, and *IND* and *YEAR* is the industry and year dummies respectively.

Table 5.5 presents our pooled ordinary least squares (OLS) regression results on the relationship between market liquidity and owners' identity. To alleviate concerns about endogeneity and spurious inferences, this study includes in all pooled-sample regressions the control variables that the literature identifies as important determinants of market liquidity. All model specifications include industry and time-fixed effects to control for time-invariant omitted industry-level factors that affect market liquidity following Poon et al. (2013). The pooled OLS regression analysis includes several regression models, each with different market liquidity measures as a dependent variable, and the identity ownership variables and the control variables as independent variables. All regression models are estimated with pooled OLS.

The study finds evidence that the proportion of shares owned by the executive board of directors (EO) affects the level of market liquidity. This is consistent with $\boldsymbol{H_{1a}}$, which predicts that EO is negatively related to the level of market liquidity. In contrast, the analysis of total costs and real friction of market liquidity produces interesting findings. EO ownership is found to significantly increase the proportional bid-ask spread (PBAS) and price impact ratio (PIMPACT) at 1% significance levels. More importantly, this study finds that EO with greater ownership in their firms

have private information that affects the market liquidity inversely, after this study controls for the well-known trading activity measures such as number of trades and trade size, which implies that EOs influence the information friction of market liquidity positively. As a result, the results provide strong support to the adverse selection hypothesis that EO ownership increases the bid-ask spread and price impact ratio, which inversely affect the market liquidity (Heflin & Shaw 2000). On the other hand, one can interpret this result under the trading hypothesis, which argues that EOs trade less in contrast with outside investors (i.e., institutional). That is, an increase in EO ownership leads to a decrease in his/her motivation, which enhances the firm's value, which leads to a decrease in market liquidity. Our findings are in line with Coffee (1991), Comerton-Forde & Rydge (2006), Heflin & Shaw (2000) and Rubin (2007).

With respect to real friction of market liquidity (i.e. trading activity measures), the findings are consistent with the trading hypothesis which suggests that EO owners trade less in their private information. In addition, it is consistent with the perspective that argues that EO negatively affects the trading activity of the firms and as a result decreases market liquidity. Specifically, EO reduces the number of trades, trade size, trading volume and turnover ratio (trading activity measures) at 1% significance level. Our findings are in line with prior studies (Heflin & Shaw 2000; Rubin 2007; Sarin et al., 2000).

The results for non-executive ownership (NEO) provide strong evidence to $\boldsymbol{H_{1b}}$, which states that the NEO has a negative impact on market liquidity. This study finds that NEO is significantly positively related to PBAS and PIMPACT at 1% significance level. Furthermore, the findings show that the relationship between the NEO and real friction of market liquidity (i.e., trading activity measures) is negative and significant at 1% level. Accordingly, the results support the adverse selection hypothesis which suggests that NEO plays a significant role in motivating the chairman of the board of directors to monitor management and eventually reduce agency costs (Shivdasani 1993; Vafeas 2003b). That is, NEO with a higher proportion of the firm's outstanding shares is found to effectively represent shareholders and thus monitor management to protect and maximise their own wealth. Moreover, with respect to real friction of market liquidity, NEO with greater ownership reduces the trading activity that reduced market liquidity. Therefore, consistent with the trading hypothesis, NEO is assumed to mitigate the agency problem through aligning the supervisory board's interests with those of shareholders and controlling the management; however, this leads to lower market liquidity.

Consequently, firms that are chaired by non-executive directors are suggested to reduce the conflict of interest between managers and shareholders by providing their firms with higher levels of monitoring and governance quality but this will reduce the level of liquidity in the market. Our results are in line with Heflin & Shaw (2000).

With respect to the outsider ownership identities, consistent with hypothesis $\boldsymbol{H_2}$, which states that there is a negative relationship between pension fund ownership (NOSHPF) and market liquidity, it is found that the NOSHPF is positively and significantly associated with PBAS and PIMPACT. These results indicate that the NOSHPF has an adverse impact on market liquidity. These findings imply that large pension fund ownership plays a stronger role in monitoring management through decreasing market liquidity. Moreover, this study finds evidence that NOSHPF decreases real friction of market liquidity through decreasing trading activity measures (i.e. number of trades, trade size, turnover ratio and trading volume). Our results are in line with existing literature that has documented that pension fund has a strong incentive to engage in investor activism (Cremers & Nair 2005; Dittmar & Mahrt-Smith 2007; Officer 2007). These studies suggest that public pension fund activism destroys firm value because of the agency problems between fund managers and members that leads to lower market liquidity.

According to the adverse selection and trading hypothesis, this study hypothesised that the foreign ownership decreases market liquidity. The results of the analysis are consistent with this argument. More interestingly, this study finds that foreign ownership increases proportional bid-ask spread and price impact ratio, while the foreign ownership has a negative impact on real friction of market liquidity such as number of trades, trade size, turnover ratio and trading volume, which leads us to accept $\boldsymbol{H_{3b}}$; that there is a negative relationship between foreign ownership and market liquidity. Thus, these findings are consistent with the adverse selection hypothesis that foreign institutions are less likely to have a positive impact on market liquidity. This is due to the fact that foreign institutional investors are perceived to be better traders given that they are better informed (Grinblatt & Keloharju 2000 ; Seasholes 2004); they monitor corporate management better than local institutions (Khanna & Palepu 2000); and they produce more timely and accurate forecasts than local analysts (Bacmann & Bolliger 2001).

With respect to investment banks (NOSHIC), this study's results show that there is a negative and significant relationship between investment banks' ownership and market liquidity; this leads us to accept $\boldsymbol{H_4}$,which states that there is a negative relationship between investment banks' ownership

and market liquidity. In particular, this study finds that there is a positive relationship between NOSHIC and PIMPACT and PBAS and a negative relationship between NOSHIC and real friction of market liquidity (i.e., trading volume, number of trades, trade size, and turnover ratio). Our results are in line with previous studies (Barabanov & McNamara 2002; Fehle 2004; Syamala et al., 2014). Regarding government ownership (NOSHGV), our results find that there is a positive impact between NOSHGV and proportional bid-ask spread and price impact ratio and negative impact of real friction of market liquidity (i.e., trading activity measures). However, with respect to trading volume, this study reports an insignificantly positive relationship between government ownership and trading volume. This leads me to accept hypothesis $\boldsymbol{H_5}$. These findings are findings are in line with Brockman & Chung (2003).

Finally, with respect to the free float shares, to the author' knowledge few studies in the ownership-liquidity relationship take into consideration the free float as one of the determinants of market liquidity. Our results in Table 5.5 reveal that there is a positive relationship between market liquidity and free float shares (NOSHFF). More specifically, the results suggest there is a negative relationship between PBAS and PIMPACT and positive impact of NOSHFF on real friction of market liquidity. However, with respect to trading volume, this study reports an insignificantly positive relationship between free float shares and trading volume. This finding leads us to accept hypothesis $\boldsymbol{H_6}$, which states there is a positive relationship between free float share and market liquidity. This is again in line with Amihud et al. (1999), Bhide (1993), Holmstrom & Tirole (1993) and Zheng & Li (2008).

Regarding cross-holdings and other holdings this study reports insignificantly positive relationship between cross-holdings and other holdings and the proportional bid-ask spread. Moreover, Table 5.5 shows an insignificantly negative relationship between cross-holdings and number of trades and trade size. With respect to employee ownership, the results show an insignificantly positive relationship with proportional bid-ask spread and price impact ratio and insignificantly negative relationship with number of trades and trading volume. This study thus reports a marginally negative relationship between cross-holdings, other holdings and employee ownership and market liquidity. These results are thus inconsistent with the result reported in Park (2009). The differences in findings of the two studies may be due to differences in the time-periods, sample size and market environment of this study, as compared to that of Park (2009).

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Regarding control variables, this study finds a positive and significant relationship between volatility and information friction measures (proportional bid-ask spread and price impact ratio). This positive relationship is common in the literature, where firms with higher volatility are exposed to higher uncertainty and information asymmetry (Black 1986; French & Roll 1986). The results also suggest a negative and insignificant relationship between volatility and real friction measures (trading volume, trade size, number of trades and turnover ratio). These results are in line with previous literature (Poon et al., 2013; Rubin 2007).

The coefficient of firm size is negative and significant with information friction of market liquidity (proportional bid-ask spread and price impact ratio) in the FTSE All-Share sample. The negative relationship confirms that larger firms have lower information asymmetry and higher liquidity because they are more able to diversify risk and have quick and greater access to the capital market. Moreover, those large firms can deal with unpredicted liquidity problems in a more effective and flexible way than smaller firms can (Konishi & Yasuda 2004). This result is in line with previous studies that have documented similar correlations between firm size and market liquidity (Heflin & Shaw 2000; Kini & Mian 1995). Moreover, Table 4.7 indicates that the share price has a significant effect on market liquidity. Under the pooled OLS estimation the positive relationship is consistent with the trading hypothesis. For instance, Adams et al. (2005) report a positive and significant relationship between share price and market liquidity.

One of the most common tests used to check for the multicollinearity problem is called the variance inflation factor (VIF), which is calculated as follows:

$$\boldsymbol{VIF = \frac{1}{tolerance}} \quad \textbf{(5.2)}$$

Where:

Tolerance = $1\text{-}R^2$

R^2 = is the coefficient of determination

The results of VIF tests indicate the multicollinearity is not a problem in our dataset. From Table 5.6 it is clear that all values are less than 10. Moreover, the average VIF is 1.15 without controlling for the trading activity measures (i.e., number of trades and trade size) and 1.23 when we controlled them. Consequently, these values confirm that our dataset is free from multicollinearity problems.

Table 5.5 Pooled OLS Analysis for the Effect of Owners' Identity on Market Liquidity

Table 5.5 presents results of the effect of ownership level and concentration on market liquidity. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \quad \text{(1a and 2a)}$$

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\gamma_4 TZ_{it}+\gamma_5 NT_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \quad \text{(1band 2b)}$$

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) dummies. The t-statistics are reported in parentheses. See Table 3.2 for variables' definitions and measurements.

	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**NT**	**TZ**	**VO**	**TR**
EO	0.04 (3.91)***	0.03 (3.01)***	0.30 (14.75)***	0.22 (11.47)***	-0.07 (-4.14)***	-0.12 (-10.18)***	-0.15 (-8.11)***	-0.10 (-8.90)***
NEO	0.11 (10.79)***	0.09 (10.09)***	0.30 (14.78)***	0.23 (12.22)***	-0.08 (-4.71)***	-0.08 (-6.96)***	-0.21 (-11.52)***	-0.07 (-6.30)***
NOSHCO	0.01 (0.02)	0.01 (0.03)	0.07 (3.41)***	0.06 (3.46)***	-0.01 (-0.04)	-0.01 (-1.02)	-0.05 (-2.85)***	-0.05 (-4.37)***
NOSHEM	0.01 (0.16)	0.01 (0.99)	0.02 (1.06)	0.02 (0.91)	-0.02 (-1.25)	-0.04 (-2.99)***	-0.01 (-0.29)	-0.03 (-3.11)***
NOSHGV	0.04 (4.08)***	0.02 (2.33)**	0.06 (3.78)***	0.04 (2.82)***	-0.06 (-4.35)***	-0.02 (-1.98)**	-0.05 (-1.25)	-0.02 (-2.18)**
NOSHIC	0.07 (3.48)***	0.04 (2.44)**	0.16 (4.10)***	0.08 (2.31)**	-0.11 (-3.40)***	-0.06 (-2.90)***	-0.09 (-2.58)***	-0.14 (-6.81)***
NOSHPF	0.06 (4.27)***	0.03 (2.29)**	0.07 (2.64)***	0.04 (1.86)*	-0.10 (-4.62)***	-0.06 (-3.57)***	-0.07 (-3.15)***	-0.06 (-4.09)***
NOSHFR	0.09 (3.88)***	0.08 (4.26)***	0.21 (4.90)***	0.15 (3.79)***	-0.03 (-1.81)*	-0.12 (-4.80)***	-0.09 (-2.28)**	-0.27 (-11.43)***
NOSHOF	0.02 (0.46)	0.01 (0.37)	0.10 (1.28)	0.07 (1.03)	-0.10 (-1.65)*	-0.05 (-1.25)	-0.16 (-2.29)**	-0.03 (-0.89)
NOSHFF	-0.03 (-1.37)	-0.24 (-3.13)***	-0.67 (-3.98)***	-0.74 (-4.70)***	0.88 (6.26)***	0.87 (8.53)***	0.18 (1.18)	1.90 (20.42)***
Market Value	-0.24 (-21.98)***	-0.14 (-12.98)***	-0.55 (-24.31)***	-0.38 (-17.00)***	0.39 (21.07)***	-0.04 (-3.09)***	0.40 (19.68)***	0.01 (0.61)
Volatility	0.21 (8.66)***	0.20 (9.26)***	0.34 (6.92)***	0.34 (7.48)***	-0.03 (-0.74)	0.02 (0.79)	-0.06 (-1.36)	-0.34 (-12.57)***
Share Price	-0.18 (-13.62)***	-0.12 (9.65)***	-0.12 (-4.30)***	-0.09 (-3.61)***	0.21 (9.14)***	-0.18 (-11.17)***	0.01 (0.39)	0.15 (10.50)***
Trade Size	-	0.05 (3.29)***	-	-0.38 (-11.92)***	-	-	-	-
Number of Trades	-	-0.25 (-22.27)***	-	-0.46 (-19.46)***	-	-	-	-
Constant	-0.26 (-5.73)***	-0.17 (-4.20)***	-0.08 (-0.95)	-0.02 (-0.20)	0.30 (4.05)***	-0.18 (-3.32)***	0.05 (0.73)	-0.35 (-1.23)
Industry	Yes	yes	Yes	yes	Yes	Yes	Yes	Yes
Year	Yes	yes	Yes	yes	Yes	Yes	Yes	Yes
Adjusted R^2	**0.74**	**0.79**	**0.75**	**0.79**	**0.58**	**0.35**	**0.58**	**0.65**
Number of Observations	2260	2260	2260	2260	2260	2260	2260	2260

Table 5.6 Variance Inflation Factors (VIFs) Test

Table 5.6 presents an overview of the maximum variance inflation factors (VIFs) test for all independent variables reported in Table 5.5. The reported VIFs are the maximum VIFs obtained from the regression analyses in STATA 11.

	Variance Inflation Factors (VIF) Test							
EO	1.18	1.22	1.18	1.22	1.22	1.22	1.22	1.22
NEO	1.16	1.18	1.16	1.18	1.18	1.18	1.18	1.18
NOSHCO	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
NOSHEM	1.14	1.15	1.14	1.15	1.15	1.15	1.15	1.15
NOSHGV	1.09	1.10	1.09	1.10	1.10	1.10	1.10	1.10
NOSHIC	1.07	1.08	1.07	1.08	1.08	1.08	1.08	1.08
NOSHPF	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
NOSHFR	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
NOSHOF	1.10	1.11	1.10	1.11	1.11	1.11	1.11	1.11
NOSHFF	1.14	1.23	1.14	1.23	1.23	1.23	1.23	1.23
Market Value	1.26	1.49	1.26	1.49	1.49	1.49	1.49	1.49
Share Price	1.16	1.14	1.16	1.14	1.14	1.14	1.14	1.14
Volatility	1.14	1.29	1.14	1.29	1.29	1.29	1.29	1.29
Number of Trades	-	1.37	-	1.37	1.37	1.37	1.37	1.37
Trade Size	-	1.71	-	1.71	1.71	1.71	1.71	1.71
Mean VIF	**1.15**	**1.23**	**1.15**	**1.23**	**1.23**	**1.23**	**1.23**	**1.23**

5.5 Further Analysis and Robustness Checks

Small Firm versus Large Firm Sample Results

By examining the impact of the owners' identity and firm size on market liquidity, our analysis can also shed some light on the widely documented firm-size anomaly in the literature. This study divides the data into small and large firms based on their market value of equity and re-examine the relationship between owners' identity and market liquidity. In fact, this check allows us to determine whether the nature of the relationship between market liquidity and owners' identity is different between small and large firms. Small (large) firms are defined as firms that have a market value of equity smaller (equal to or greater) than the median market value of equity of million for the entire sample of 226 firms. In Table 5.7 Panels A and B, this study reports the pooled OLS year and industry dummies results for large and small firms respectively.

With respect to insider ownership identity, Table 5.7 Panels A and B reveals that the effect of executive and non-executive ownership on proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) is stronger and significant for small firms than larger firms. For instance, executive ownership (EO) has a stronger negative and significant effect on trade size (TZ) and trading volume (VO) in comparison with large firms. As shown in Table 5.7 Panels A and B, non-executive ownership (NEO) appears to have a positive and significant effect on PBAS for small

firms. Moreover, Table 5.7 Panels A and B report a stronger negative and significant relationship between NEO and trade size (TZ), turnover ratio (TR), trading volume (VO) and number of trades (NT) relative to large firms.

Regarding cross holding (NOSHCO), Table 5.7 Panels A and B reveal that NOSHCO has a stronger positive and significant relationship with PBAS and Pimpact for small firms than large firms. Moreover, NOSHCO has a stronger negative and significant relationship with trading volume (VO) and number of trades (NT) in comparison with large firms. In contrast, for large firms Table 5.7 Panel A reveals that investment company holding (NOSHIC) has a positive and insignificant relationship with real friction measures (i.e., TZ and VO), whereas it has a negative and insignificant impact on PBAS and Pimpact. In the same spirit, other holding (NOSHOF) has a positive and insignificant relationship with real friction measures (i.e., TZ), whereas it has a positive and insignificant impact on PBAS and Pimpact.

It is noticeable from Table 5.7 Panels A and B that employee holding (NOSHEM) has a stronger and more positive effect on proportional bid-ask spread (PBAS) for small firms. Furthermore, NOSHEM has a stronger negative and significant relationship with number of trades (NT) in comparison with large firms. With respect to government ownership (NOSHGV), pension fund ownership (NOSHPF) and foreign ownership (NOSHFR) have a stronger positive and significant effect on Pimpact and a negative and significant effect on trade size (TZ). As shown in Table 5.7 Panels A and B that the free float shares (NOSHFF) there is a positive relationship between market liquidity and free float shares. Specifically, there is a negative relationship between proportional bid-ask spread and price impact ratio and positive impact of real friction of market liquidity.Our findings are in line with Amihud et al. (1999), Bhide (1993), Holmstrom & Tirole (1993) and Zheng & Li (2008).

Table 5.7 The Firm's Size Effect on the Relationship between the Owners' Identity and Market Liquidity

Table 5.7 presents results of the effect of ownership level and concentration on market liquidity. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it}=\alpha_0+\beta_1EO_{it}+\beta_2NEO_{it}+\beta_3NOHFF_{it}+\beta_4NOSHIC_{it}+\beta_5NOSHOF_{it}+\beta_6NOSHPF_{it}+\beta_7NOSGV_{it}+\beta_8NOSHEM_{it}+\beta_9NOSHCO_{it}+\beta_{10}NOSHFR_{it}+\gamma_1MV_{it}+\gamma_2P_{it}+\gamma_3VOL_{it}+\sum_{i=1}^{n}IND+\sum_{i=1}^{n}YEAR+\varepsilon_i \ldots\ldots\ldots\ldots \text{(1a and 2a)}$$

$$LIQ_{it}=\alpha_0+\beta_1EO_{it}+\beta_2NEO_{it}+\beta_3NOHFF_{it}+\beta_4NOSHIC_{it}+\beta_5NOSHOF_{it}+\beta_6NOSHPF_{it}+\beta_7NOSGV_{it}+\beta_8NOSHEM_{it}+\beta_9NOSHCO_{it}+\beta_{10}NOSHFR_{it}+\gamma_1MV_{it}+\gamma_2P_{it}+\gamma_3VOL_{it}+\gamma_4TZ_{it}+\gamma_5NT_{it}+\sum_{i=1}^{n}IND+\sum_{i=1}^{n}YEAR+\varepsilon_{i,}\ldots\ldots\ldots\ldots \text{(1band 2b)}$$

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), and number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) dummies. The t-statistics are reported in parentheses. See Table 3.2 for variables' definitions and measurements.

Panel A Large Firms' Market value of equity> 432.7 million								
	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**NT**	**TZ**	**VO**	**TR**
EO	0.02 (1.13)	0.01 (0.57)	0.16 (5.63)***	0.12 (4.23)***	-0.10 (-4.08)***	-0.07 (-3.72)***	-0.11 (-3.67)***	-0.02 (-1.61)
NEO	0.04 (2.82)**	0.03 (2.59)***	0.21 (7.43)***	0.19 (6.86)***	-0.05 (-2.08)**	-0.03 (-1.96)**	-0.12 (-4.39)***	-0.02 (-1.69)*
NOSHCO	0.03 (2.35)**	0.02 (2.26)**	0.03 (1.25)	0.04 (1.62)	-0.02 (-0.96)	0.01 (0.74)	-0.01 (-0.43)	-0.01 (-0.19)
NOSHEM	0.02 (0.14)	0.03 (-0.13)	0.03 (1.14)	0.04 (1.51)	-0.03 (-1.40)	-0.03 (-0.16)	-0.05 (-1.78)*	-0.04 (-0.18)
NOSHGV	0.01 (0.57)	0.01 (0.24)	0.04 (2.16)**	0.03 (1.72)*	-0.03 (-1.87)*	-0.01 (-0.54)	-0.02 (-1.17)	-0.01 (-1.99)**
NOSHIC	-0.03 (-1.30)	-0.03 (-1.60)	-0.01 (-0.16)	-0.03 (-0.77)	0.07 (1.80)*	0.04 (1.24)	0.01 (0.05)	0.07 (3.44)***
NOSHPF	0.07 (4.15)***	0.06 (3.57)***	0.07 (1.82)*	0.05 (1.47)	-0.09 (-2.79)***	-0.03 (-1.21)	-0.04 (-1.06)	-0.04 (-2.66)***
NOSHFR	0.02 (0.79)	0.01 (0.85)	0.11 (2.38)**	0.11 (2.47)**	-0.01 (-0.13)	-0.01 (-0.19)	-0.07 (-1.47)	-0.05 (-2.66)***
NOSHOF	7.25e-06 (0.00)	0.03 (0.41)	0.16 (0.90)	0.10 (0.58)	-0.29 (-1.89)*	-0.05 (-0.42)	-0.32 (-1.70)*	-0.15 (-1.91)*
NOSHFF	-0.20 (-1.61)***	-0.14 (-1.17)***	-0.68 (-2.58)***	-0.57 (-2.25)**	0.48 (2.19)**	0.05 (0.33)	0.66 (2.50)**	0.38 (3.46)***
Market Value	-0.27 (-11.17)***	-0.21 (-8.66)***	-0.73 (-14.36)***	-0.61 (-11.72)***	0.47 (11.05)***	0.00 (0.02)	0.50 (9.78)***	0.01 (0.24)
Volatility	0.09 (2.70)***	0.10 (2.96)***	0.07 (1.03)	0.01 (0.15)	-0.12 (-1.99)**	-0.13 (-2.79)***	-0.10 (-1.40)	-0.18 (-5.95)***
Share Price	-0.02 (-1.15)	0.00 (0.03)	0.13 (3.52)***	0.12 (3.18)***	0.11 (3.58)***	-0.17 (-6.80)***	-0.13 (-3.57)***	-0.01 (-0.66)
Trade Size	-	0.04 (2.20)**	-	-0.25 (-5.38)***	-	-	-	-
Number of Trades	-	-0.11 (-6.42)***	-	-0.25 (-6.89)***	-	-	-	-
Constant	-1.46 (-12.07)***	-1.38 (-11.64)***	-1.48 (-5.77)***	-1.32 (-5.28)***	0.68 (3.14)***	-0.02 (-0.13)	0.64 (2.49)**	-2.46 (-22.85)***
Industry	Yes	Yes	Yes	Yes	Yes	yes	yes	yes
Year	Yes	Yes	Yes	Yes	Yes	yes	yes	yes
Adjusted R2	**0.41**	**0.44**	**0.43**	**0.47**	**0.34**	**0.36**	**0.29**	**0.26**
Number of Observations	1026	1026	1026	1026	1026	1026	1026	1026

Panel B Small Firms' Market value of equity< 432.7 million								
	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**NT**	**TZ**	**VO**	**TR**
EO	0.04 (5.58)***	0.02 (4.02)***	0.15 (5.28)***	0.13 (4.93)***	-0.01 (-0.50)	-0.08 (-4.49)***	-0.07 (-2.54)**	-0.03 (-2.16)**
NEO	0.10 (6.70)***	0.08 (6.10)***	0.18 (6.26)***	0.12 (4.63)***	-0.10 (-3.80)***	-0.04 (-2.37)**	-0.19 (-7.11)***	-0.04 (-3.25)***
NOSHCO	0.01 (0.83)	0.02 (0.30)	0.03 (1.16)	0.02 (0.13)	-0.06 (-2.22)**	-0.03 (-0.15)	-0.08 (-2.82)***	-0.01 (-0.47)
NOSHEM	0.02 (1.29)	0.04 (0.24)	0.02 (0.55)	0.02 (0.56)	-0.07 (-2.63)***	-0.02 (-1.26)	-0.07 (-2.71)***	-0.03 (-1.71)*
NOSHGV	0.07 (4.60)***	0.03 (2.95)***	0.07 (2.75)***	0.04 (1.41)	-0.10 (-3.72)***	-0.03 (-1.86)*	-0.01 (-0.45)	-0.03 (-0.26)
NOSHIC	0.08 (2.65)***	0.04 (1.66)*	0.10 (1.75)*	0.03 (0.61)	-0.14 (-2.57)**	-0.01 (-0.07)	-0.08 (-1.57)	-0.02 (-0.60)
NOSHPF	0.07 (3.72)***	0.02 (1.12)	0.08 (2.37)**	0.02 (0.78)	-0.15 (-4.58)***	-0.07 (-3.44)***	-0.10 (-3.29)***	-0.05 (-2.74)***
NOSHFR	0.03 (1.09)	0.03 (1.27)	0.23 (4.30)***	0.22 (4.54)***	-0.02 (-0.29)	-0.02 (-0.77)	-0.14 (-2.85)***	-0.05 (-2.07)**
NOSHOF	0.01 (0.06)	0.04 (0.39)	0.02 (0.11)	0.04 (0.19)	-0.02 (-0.07)	-0.35 (-2.36)**	-0.30 (-1.35)	-0.01 (-0.06)
NOSHFF	-0.67 (-4.66)***	-0.38 (-3.15)***	-1.10 (-4.27)***	-0.69 (-2.96)***	0.92 (3.75)***	0.16 (1.00)	0.96 (3.92)***	0.53 (4.14)***
Market Value	-0.06 (-3.00)***	-0.02 (-1.26)	-0.19 (-4.67)***	-0.12 (-3.44)***	0.14 (3.66)***	-0.02 (-0.89)	0.20 (5.16)***	0.03 (1.49)
Volatility	0.14 (4.11)***	0.12 (3.94)***	0.18 (2.83)***	0.17 (2.98)***	-0.06 (-0.97)	0.09 (2.19)**	0.04 (0.74)	0.11 (3.62)***
Share Price	-0.17 (-8.08)***	-0.07 (-3.78)***	0.03 (1.01)	0.08 (2.26)**	0.22 (5.90)***	-0.30 (-11.91)***	-0.04 (-1.20)	0.04 (2.11)**
Trade Size	-	0.12 (5.41)***	-	-0.20 (-4.53)***	-	-	-	-
Number of Trades	-	-0.28 (-18.13)***	-	-0.48 (-15.90)***	-	-	-	-
Constant	-0.94 (-7.78)***	-0.91 (-8.73)***	-2.44 (-11.15)***	-2.05 (-10.25)***	0.47 (2.28)**	0.78 (5.54)***	0.91 (4.37)***	-2.85 (-26.37)***
Industry	Yes	Yes	Yes	yes	Yes	Yes	yes	yes
Year	Yes	Yes	Yes	yes	Yes	Yes	yes	yes
Adjusted R^2	**0.32**	**0.53**	**0.21**	**0.36**	**0.25**	**0.36**	**0.17**	**0.11**
Number of Observations	1026	1026	1026	1026	1026	1026	1026	1026

Inclusions of Additional Control Variables

In the last test, this study controls for more additional variables that may affect market liquidity. The first variable is the research and development expenses. This study uses a dummy variable to control for the existence of high technology firms. This dummy variable takes one if the firm is in a high technology industry (has a research and development expenses) and zero otherwise. The data on the research and development expenses was extracted from the Worldscope databases. Existing literature has documented that the research and development expenses can be used as a proxy of information asymmetry (Aboody & Lev 2000; Zeckhouser & Pound 1990). In particular, these studies state that firms that have research and development expenses suffer from more information asymmetry and the probability of insider trading from these firms is high. As a result, the study expects to have a positive relationship between the high technology firms and proportional bid-ask spread and Amihud (2002) illiquidity ratio. Moreover, this study controls for the firm's age. Theoretically, firms whose stocks have been traded for a long time in the stock market would be

more liquid as they have lower information asymmetry between inside and outside investors. Following Sarin et al. (2000), this study measures the firm age as the natural logarithm of the number of years since the firm was founded. Finally, this study controls for financial leverage measured as the percentage of total debt to total capital.

Table 5.8 reports the results after including these variables. The results in Table 5.8 are similar to and consistent with the results obtained in the previous section. Nevertheless, it is noticeable that high technology firms have a positive but insignificant relationship with proportional bid-ask spread and price impact illiquidity ratio. However, high technology firms have a significant and negative relationship with the real friction of market liquidity (i.e. number of trades, trade size, turnover ratio and trading volume). These results are in line with previous studies (Aboody & Lev 2000; Zeckhouser & Pound 1990). Regarding the financial leverage, as expected, financial leverage is positively and significantly related to trading activity measures (i.e., turnover ratio, number of trades, trade size and trading volume) and negatively with proportional bid-ask spread and price impact ratio. This positive effect is consistent with prior empirical papers (Rubin 2007; Sarin et al., 2000). However, financial leverage has a negative and significant impact on proportional bid-ask spread and price impact ratio. This negative relationship may support the argument that debt holders may substitute as a monitoring device (Jensen 1986; Williamson 1988). As can be seen in the results reported in Table 5.8, on average FTSE All-Share firms with more history in the market have insignificant negative relationship with proportional bid-ask spread and price impact illiquidity ratio; in contrast they have insignificant positive relationship with trading activity measures (i.e. number of trades, trade size, turnover ratio and trading volume).

It is noticeable from Table 5.8 that the results regarding the effect of insider and outsider identity on market liquidity are consistent with the main results that were obtained in Table 5.5. Accordingly, this test confirms that our main results do not suffer from multicollinearity problems. Statistically, Brooks (2008) states that when multicollinearity exists the regression model will become very sensitive to any changes in the independent variables and adding or removing any variable will affect the model sharply.

Table 5.8 Pooled OLS analysis on the relationship between ownership Identity and Market Liquidity (inclusion of other control variables- Leverage, High technology, and Firm age)

Table 5.8 presents results of the effect of owners identity on market liquidity. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\gamma_4 Lev_{it}+\gamma_5 HTech_{it}+\gamma_6 FAge_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \quad \text{(1a and 2a)}$$

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\gamma_4 TZ_{it}+\gamma_5 NT_{it}+\gamma_6 Lev_{it}+\gamma_7 HTech_{it}+\gamma_8 FAge_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \quad \text{(1band 2b)}$$

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade size (TZ), trading volume (VO), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), leverage (Lev), high technology firms (HTech), firm age (FAge), Industry (IND) and Year (YEAR) dummies. See Table 3.2 for variables' definitions and measurements.

	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**NT**	**TZ**	**VO**	**TR**
EO	0.04 (3.91)***	0.03 (3.01)***	0.30 (14.75)***	0.22 (11.47)***	-0.07 (-4.14)***	-0.12 (-10.18)***	-0.15 (-8.11)***	-0.10 (-8.90)***
NEO	0.11 (10.79)***	0.09 (10.09)***	0.30 (14.78)***	0.23 (12.22)***	-0.08 (-4.71)***	-0.08 (-6.96)***	-0.21 (-11.52)***	-0.07 (-6.30)***
NOSHCO	0.01 (0.02)	0.01 (0.03)	0.07 (3.41)***	0.06 (3.46)***	-0.01 (-0.04)	-0.01 (-1.02)	-0.05 (-2.85)***	-0.05 (-4.37)***
NOSHEM	0.01 (0.16)	0.01 (0.99)	0.02 (1.06)	0.02 (0.91)	-0.02 (-1.25)	-0.04 (-2.99)***	-0.01 (-0.29)	-0.03 (-3.11)***
NOSHGV	0.04 (4.08)***	0.02 (2.33)**	0.06 (3.78)***	0.04 (2.82)***	-0.06 (-4.35)***	-0.02 (-1.98)**	-0.01 (-0.25)	-0.02 (-2.18)**
NOSHIC	0.07 (3.48)***	0.04 (2.44)**	0.16 (4.10)***	0.08 (2.31)**	-0.11 (-3.40)***	-0.06 (-2.90)***	-0.09 (-2.58)***	-0.14 (-6.81)***
NOSHPF	0.06 (4.27)***	0.03 (2.29)**	0.07 (2.64)***	0.04 (1.86)*	-0.10 (-4.62)***	-0.06 (-3.57)***	-0.07 (-3.15)***	-0.06 (-4.09)***
NOSHFR	0.09 (3.88)***	0.08 (4.26)***	0.21 (4.90)***	0.15 (3.79)***	-0.03 (-0.81)	-0.12 (-4.80)***	-0.09 (-2.28)**	-0.27 (-11.43)***
NOSHOF	0.02 (0.46)	0.01 (0.37)	0.10 (1.28)	0.07 (1.03)	-0.10 (-1.65)*	-0.05 (-1.25)	-0.16 (-2.29)**	-0.03 (-0.89)
NOSHFF	-0.03 (-0.37)	-0.24 (-3.13)***	-0.67 (-3.98)***	-0.74 (-4.70)***	0.88 (6.26)***	0.87 (8.53)***	0.18 (1.18)	1.90 (20.42)***
Market Value	-0.24 (-21.98)***	-0.14 (-12.98)***	-0.55 (-24.31)***	-0.38 (-17.00)***	0.39 (21.07)***	-0.04 (-3.09)***	0.40 (19.68)***	0.01 (0.61)
Volatility	0.21 (8.66)***	0.20 (9.26)***	0.34 (6.92)***	0.34 (7.48)***	-0.03 (-0.74)	0.02 (0.79)	-0.06 (-1.36)	-0.34 (-12.57)***
Share Price	-0.18 (-13.62)***	-0.12 (9.65)***	-0.12 (-4.30)***	-0.09 (-3.61)***	0.21 (9.14)***	-0.18 (-11.17)***	0.01 (0.39)	0.15 (10.50)***
Trade Size	-	0.05 (3.29)***	-	-0.38 (-11.92)***	-	-	-	-
Number of Trades	-	-0.25 (-22.27)***	-	-0.46 (-19.46)***	-	-	-	-
Lev	-0.23 (-5.03)***	-0.11 (-2.90)***	-0.41 (-4.76)***	-0.22 (-2.77)***	0.44 (5.70)***	0.02 (0.44)	0.30 (3.64)***	0.21 (5.41)***
FAge	-0.02 (-1.22)	-0.01 (-0.70)	-0.01 (-0.18)	-0.01 (-0.01)	0.03 (0.99)	0.03 (1.49)	0.01 (0.39)	0.02 (1.53)
HTech	0.03 (1.63)	0.01 (0.75)	0.02 (0.66)	0.01 (0.07)	-0.06 (-1.93)*	-0.03 (-1.25)	-0.09 (-2.61)***	-0.04 (-2.87)***
Constant	-0.26 (-5.73)***	-0.17 (-4.20)***	-0.08 (-0.95)	-0.02 (-0.20)	0.30 (4.05)***	-0.18 (-3.32)***	0.05 (0.73)	-0.35 (-1.23)
Industry	yes	yes	Yes	yes	Yes	Yes	Yes	Yes
Year	yes	yes	Yes	yes	Yes	Yes	Yes	Yes
Adjusted R^2	**0.74**	**0.79**	**0.75**	**0.79**	**0.58**	**0.35**	**0.58**	**0.65**
Number of Observations	2260	2260	2260	2260	2260	2260	2260	2260

5.6 Summary

This chapter has provided important empirical evidence on the role of owners' identity on market liquidity in the UK. This study investigates how insider and outsider ownership identity are related to market liquidity. This study covers all the publicly listed firms on the London Stock Exchange in the FTSE All-Share Index. The sample of the current study is constructed from non-financial sectors. The study covers a 10-year time period from 2003-2012. This study advances our understanding of the role of owners' identity in influencing market liquidity. The academic literature provides support for the importance of studying the type of ownership as some owners typically have direct access to management, and experience and expertise in gleaning insights from financial information. For instance, larger institutional owners have greater ability, and greater incentives in the form of potentially higher trading profits, to acquire value-relevant information, relative to smaller institutional owners; this results in a higher bid-ask spread and lower market liquidity (Fehle 2004; Neas 2004).

This study provides evidence that executive and non-executive directors' ownership is negatively related to the level of market liquidity. In particular, executive and non-executive directors' ownership are found to significantly increase the proportional bid-ask spread (PBAS) and price impact ratio (PIMPACT). More importantly, after this study controls for the well-known trading activity measures such as number of trades and trade size, still there is a positive relationship between executive and non-executive directors' ownership and proportional bid-ask spread and price impact ratio, which implies that executive and non-executive directors' ownership influence the information friction of market liquidity positively. As a result, the results provide strong support for the adverse selection hypothesis that executive and non-executive directors' ownership increase the bid-ask spread and price impact ratio, which inversely affects the market liquidity (Heflin & Shaw 2000). On the other hand, one can interpret this result under the trading hypothesis, which argues that executive and non-executive directors trade less in contrast with outside investors (i.e., institutional). That is, an increase in executive directors' ownership leads to a decrease in his/her motivation, which enhances the firm's value, which leads to a decrease in market liquidity. Our findings are in line with Coffee (1991), Comerton-Forde & Rydge (2006), Heflin & Shaw (2000) and Rubin (2007).

With respect to the outsider ownership identities, this study finds that for all controlled shareholders (investment companies, foreign, government, and pension fund) there is a negative relationship between these controlled shareholders and market liquidity. In particular, after this study controls for the well-known trading activity measures such as number of trades and trade size, still there is a positive relationship between controlled shareholders' ownership and proportional bid-ask spread and price impact ratio. As a result, the results provide strong support for the adverse selection hypothesis that controlled shareholders increase the bid-ask spread and price impact ratio, which inversely affects the market liquidity. Moreover, with respect to the real friction of market liquidity (i.e., number of trades, trade size, trading volume, turnover ratio), this study reports a negative relationship between controlled shareholders and real friction of market liquidity and this holds for executive and non-executive directors' ownership.

With respect to cross-holdings and other holdings this study reports insignificantly positive relationship between cross-holdings and other holdings and the proportional bid-ask spread. The findings also show an insignificantly negative relationship between cross-holdings and number of trades and trade size. Regarding employee ownership, the findings show an insignificantly positive relationship with price impact ratio. This study therefore notices a marginally negative relationship between cross-holdings, other holdings and employee ownership and market liquidity. The findings of this study are thus inconsistent with the result reported in Park (2009). This may be due to differences in the time-periods, sample size and market environment of this study as compared to that of Park (2009).

Nevertheless, with respect to the free float shares, to the author's' knowledge few studies in the ownership- liquidity relationship take into consideration the free float as one of the determinants of market liquidity (Ginglinger & Hamon 2007; Park 2009). Our results reveal that there is positive relationship between market liquidity and free float shares. Specifically, there is a negative relationship between proportional bid-ask spread and price impact illiquidity ratio and positive impact on the real friction of market liquidity. Our findings are in line Amihud et al. (1999), Bhide (1993), Holmstrom & Tirole (1993) and Zheng & Li (2008). These results are robust after controlling for the firm's size effect and adding other control variables such as research and development expenses, leverage, firm age and applying different sensitivity specification tests. The next chapter investigates the relationship between ownership level, concentration, owners' identity and market liquidity during the recent financial crisis.

Chapter 6

The Effect of Ownership level, concentration and Owners' Identity on Market Liquidity: Evidence from the Recent Financial Crisis

6.1 Introduction

According to Bhide (1993), since the Great Depression, "*US regulation has promoted market liquidity of the efficient governance of firms. The liquidity prompted by the US policies has obvious benefits: investors can en-cash their assets quickly and diversify cheaply. The same policies, however, impair governance by encouraging diffuse stockholding and discouraging active investing*". In addition, more research has been conducted which test how the behaviour of investors changes during the market downturn (Brunnermeier & Pedersen 2009; Garleanu & Pedersen 2007; Huang & Wang 2009; Kyle & Xiong 2001; Xiong 2001). These studies suggest that institutional ownership declined during the financial crisis, which led to a lower bid-ask spread. However, in the aftermath of the recent financial crisis, governments of developed countries had to defend their investors. For instance, the recent financial crisis of 2007-2009, which has been described as the worst since the Great Depression, revealed the weakness in corporate governance mechanisms regarding institutional shareholder engagement in the monitoring process.

In the light of the recent crisis, the Walker Review (2009) recommended that the institutional Stewardship Code should be adopted as an official UK code of practice for institutional investors. As a result, the UK Stewardship Code (2010) was established which strongly focuses on enhancing the level of engagement between institutional investors and companies to help improve long-term returns to shareholders and the efficient exercise of governance responsibilities. Moreover, the consequences of the recent financial crisis also led the British government to bail out many large financial institutions. For example, Northern Rock, Bradford and Bingley, Alliances and Leicester all suffered from substantial defaults during the recent financial crisis in the UK (Akbar et al., 2013). Northern Rock was supported by an emergency loan from the Bank of England at the onset of the crisis; however, by February 2008 Northern Rock had gone into state ownership (Hall 2009). To further understand the institutional holding patterns; during the recent financial crisis, this study classifies institutional blockholder ownership into groups according to their identity. In this regard, Sias (2004) illustrates that different investor identities have different effects on market liquidity during the market downturn.

As a consequences, this study classifies institutional and non-institutional blockholders according to the Datastream filings into government companies (NOSHGV), investment companies (NOSHIC), public pension funds (NOSHPF) and cross companies (NOSHOF). Furthermore, this study uses the BoardEx database to group insider investors into executive (EO), and non-executive (NEO) owners. As a result, the aim of this chapter, therefore, is to provide empirical evidence from the recent financial crisis. In particular, this chapter examines the effect of ownership level, concentration and the owners' identity on market liquidity in three different sub-periods. These periods are pre-crisis, crisis and post-crisis.

The rest of this chapter proceeds as follows: section 6.2 provides the hypothesis development in this chapter. The descriptive statistics on the ownership and market liquidity measures in the pre-crisis, during and post-crisis periods are presented in section 6.3. Section 6.4 presents the results from the main regression model. Section 6.5 provides additional sensitivity tests using the change in variables. Finally, section 6.6 presents a short summary of the chapter and generate links with the next chapter.

6.2 Hypothesis Development

The discussion in Chapter 2 on the role of the ownership structure during the recent financial crisis has revealed a limited number of empirical papers that examine the relationship between ownership level, concentration, owners' identity and market liquidity in the crisis period. Further, the findings on the above-mentioned relationship seem to be inconsistent. For instance, Poon et al. (2013) report that the institutional ownership has a positive impact on bid-ask spread before and during the crisis periods. Nevertheless, the effect of owners' identity was discussed in the previous chapter. Moreover, the recent financial crisis of 2007-2009, which was described as the worst since the Great Depression, also revealed the weakness in corporate governance mechanisms regarding the institutional shareholders' engagement in the monitoring process. In the light of the recent crisis, the Walker Review (2009) recommended that the institutional Stewardship Code should be adopted as an official UK code of practice for institutional investors. As a result, the UK Stewardship Code (2010) was established which strongly focuses on enhancing the level of engagement between institutional investors and companies to help improve long-term returns to shareholders and the efficient exercise of governance responsibilities.

Furthermore, existing literature states that institutional investors seem to adopt a passive role towards monitoring and disciplining firm's management (Maug 1998; Plender 1997). Prior studies have suggested that institutional investors rarely take action in corporate monitoring because they regard liquidity as more important than playing an active role in monitoring the firm's management (Bhide 1993; Coffee 1991). Moreover, institutional shareholders are blamed for their passivity and their focus on short-term rather than long-term returns during the crisis period (Chen & Poon 2007; Chu & Song 2010; Mitton 2002). Consequently, most corporate governance codes around the world emphasise the importance of institutional investors as one of the corporate governance mechanisms.

In the UK, the recent 2012 Stewardship Code aims to encourage institutional shareholders to play an active role in corporate governance mechanisms. In particular, the main aim behind the Stewardship Code (2012) is to increase the engagement activities of institutional investors, which require them to publicly disclose their commitment to a stewardship obligation or to explain their alternative investment approach if they are unwilling to assume such a commitment. Moreover, this code has emphasised that some institutional investors such as pension funds must take a more active role in the monitoring process. Prior literature did not provide a clear link on how the owners' identity affects market outcomes and particularly market liquidity (Poon et al., 2013). In addition, none of these studies examines the effect of owners' identity on market liquidity in the crisis period.

The liquidity effect of foreign ownership during a financial crisis seems inherently interesting for two reasons. First, during the financial crisis, it has been argued that foreign investors tend to liquidate their positions in local stocks and flee to their home countries, thereby spreading one country's financial crisis to others (Boyer et al., 2006; Calomiris et al., 2010). When faced with sudden liquidity dry-up and capital constraints during market turmoil, one would expect foreign investors to play a different role in local stock liquidity, especially for foreign non-block investors who own relatively small stakes in firms and are less committed to business monitoring. Second, if foreign block investors introduce the informational barrier to local investors and heighten the information uncertainty of local firms, its adverse liquidity effect could become more pronounced during the crisis period when market participants tend to be more risk averse to uncertainty (Brunnermeier & Pedersen 2009; Lang & Maffet 2011; Vayanos 2004).

Taken together, it is clear that more investigation is required in addressing how the effect of ownership level, concentration and the owners' identity is related to market liquidity during the crisis period. The limited empirical work and the mixed results also reveal the need for more empirical evidence. This chapter relies on the same theoretical literature used in Chapters 4 and 5 to develop the hypotheses on ownership structure variables and owners' identity on market liquidity. Nevertheless, to consider the effect of the recent financial crisis these hypotheses are tested in three different sub-periods. Following previous literature (see for example, Akbar et al., 2013; Kontonikas et al., 2013; Florackis et al., 2014), the pre-crisis period is chosen as 2004-2006, the crisis period is chosen as, 2007-2009, and the post-crisis period is chosen as 2010-2012. To avoid repetition, the study directly proposes the following hypotheses:

Hypothesis 1a: *There is a negative relationship between insider ownership and market liquidity in the pre-crisis period.*

Hypothesis 1b: *There is a negative relationship between insider ownership and market liquidity in the crisis period.*

Hypothesis 1c: *There is a negative relationship between insider ownership and market liquidity in the post-crisis period.*

Hypothesis 2a: *There is a negative relationship between ownership concentration and market liquidity in the pre-crisis period.*

Hypothesis 2b: *There is a negative relationship between ownership concentration and market liquidity in the crisis period.*

Hypothesis 2c: *There is a negative relationship between ownership concentration and market liquidity in the post-crisis period.*

Hypothesis 3a: *There is a positive relationship between institutional ownership and market liquidity in the pre-crisis period.*

Hypothesis 3b: *There is a positive relationship between institutional ownership and market liquidity in the crisis period.*

Hypothesis 3c: *There is a positive relationship between institutional ownership and market liquidity in the post-crisis period.*

Hypothesis 4a: *There is a negative relationship between executive and non-executive director's ownership and market liquidity in the pre-crisis period.*

Hypothesis 4b: *There is a negative relationship between executive and non-executive director's ownership and market liquidity in the crisis period.*

Hypothesis 4c: *There is a negative relationship between executive and non-executive director's ownership and market liquidity in the post-crisis period.*

Hypothesis 5a: *There is a negative relationship between controlled shareholders (government, employee, pension fund, foreign, cross- holding, investment banks and other holding) and market liquidity in the pre-crisis period.*

Hypothesis 5b: *There is a negative relationship between controlled shareholders (government, employee, pension fund, foreign, cross holding, investment banks and other holding) and market liquidity in the crisis period.*

Hypothesis 5c: *There is a negative relationship between controlled shareholders (government, employee, pension fund, foreign, cross holding, investment banks and other holding) and market liquidity in the post-crisis period.*

Hypothesis 6a: *There is a positive relationship between free float shares and market liquidity in the pre-crisis period.*

Hypothesis 6b: *There is a positive relationship between free float shares and market liquidity in the crisis period.*

Hypothesis 6c: *There is a positive relationship between free float shares and market liquidity in the post-crisis period.*

6.3. Descriptive Statistics

Table 6.1 presents the average and median differences level of ownership level, concentration, owners' identity, and market liquidity variables for FTSE All-Share companies in the three different sub-periods. As discussed above, following previous literature (see for example, Akbar et al., 2013; Kontonikas et al., 2013; Florackis et al., 2014), the pre-crisis period is chosen as 2004-2006, the crisis period is chosen as, 2007-2009, and the post-crisis period is chosen as 2010-2012. The study starts the pre-crisis period from 2004 instated of 2003 to offer a balanced period around the crisis event as, by doing this, both the pre and post periods will cover three years. In addition, balanced periods around the crisis event mitigate the issue of skewness in the degrees of freedom in the pre and post periods; see Poon et al. (2013) for a similar approach.

Table 6.1 Panel (A) shows that the average insider ownership (IO) increased significantly from 9% in the pre-crisis period to 11% in the crisis period. A similar pattern applies to institutional ownership (INSO) with a mean value that increased significantly from 59% in the pre-crisis period to 76% in the crisis period. With respect to large shareholders (LS), they significantly decreased from 25% in the pre-crisis period to 24% in the crisis period. Regarding market liquidity, Table 6.1 Panel (A) shows that proportional bid-ask spread decreased from 2.4% in the pre-crisis period to 1.5% in the crisis period. Moreover, turnover ratio (TR) decreased from 2.4% in the pre-crisis period to 1.5% in the crisis period. Likewise, trade size (TZ) decreased significantly from 11.33 in the pre-crisis period to 5.17 in the crisis period. Regarding trading volume (VO), as shown in Table 6.1 Panel (A), it increased significantly from 2903.3 in the pre-crisis period to 3111.3 in the crisis period. Our results are in line with previous studies (Poon et al., 2013; Sias 2000).

With respect to owners' identity, Table 6.1 Panel (A) shows that no significant changes are observed for the executive director's ownership (EO) and non-executive's director's ownership between the pre-crisis and crisis periods. Likewise, for cross-holding (NOSHCO) and other holding (NOSHOF) no significant changes are observed between the pre-crisis and crisis periods. With respect to the employee holding (NOSHEM), this increased insignificantly from 9% in the pre-crisis period to 11% in the crisis period. Furthermore, government ownership (NOSHGV) increased from in the pre-crisis period, when it was 0.1%, to 0.2% in the crisis period. Nevertheless, investment company holding (NOSHIC) decreased from the pre-crisis period 29% to 24% in the crisis period. In addition, pension fund holding (NOSHPF) decreased significantly from the pre-crisis period, when it was 2%, to 0.9% in the crisis period

For the pre-crisis and post-crisis differences, Table 6.1 Panel (B) shows that the average insider ownership (IO) increased significantly from 9% in the pre-crisis period to 10% in the crisis period. A similar pattern applies to institutional ownership (INSO) with a mean value that increased significantly from 59% in the pre-crisis period to 78% in the post-crisis period. With respect to large shareholders (LS), they decreased significantly from 25% in the pre-crisis period to 21% in the post-crisis period. Similar to that, blockholders (BKO) decreased significantly from 20% in the pre-crisis period to 17% in the post-crisis period. Regarding market liquidity, Table 6.1 Panel (B) shows that proportional bid-ask spread decreased significantly from 2.4% in the pre-crisis period to 1.1% in the post-crisis period. Moreover, price impact ratio (Pimpact) decreased insignificantly from 0% in the pre-crisis period to 9.64E-04% in the post-crisis period. Nevertheless, number of trades (NT) increased significantly from 280.7 in the pre-crisis period to 933.67 in the post-crisis period. However, turnover ratio (TR) decreased significantly from 0.80% in the pre-crisis period to 0.4% in the post-crisis period. Likewise, trade size (TZ) decreased significantly from 11.33 in the pre-crisis period to 2.93 in the post-crisis period. With respect to trading volume (VO), it decreased significantly from 2903.3 in the pre-crisis period to 1714.89 in the post-crisis period. Our results are in line with previous studies (Poon et al., 2013; Sias 2000).

With respect to owners' identity, Table 6.1 Panel (B) shows the average executive directors' ownership (EO) increased significantly from 6% in the pre-crisis period to 7% in the post-crisis period. However, non-executive ownership (NEO) decreased insignificantly from 3% in the pre-crisis period to 2% in the post-crisis period. However, for other holding (NOSHOF) no significant changes are observed between the pre-crisis and post-crisis periods. With respect to the employee holding (NOSHEM), it increased significantly from 9% in the pre-crisis period to 12% in the crisis period. Furthermore, government ownership (NOSHGV) increased significantly from 0.1% in the pre-crisis period to 0.3% in the crisis period. Nevertheless, pension fund holding (NOSHPF) decreased significantly from the pre-crisis period, when it was 2%, to 1% in the post-crisis period. Moreover, foreign ownership (NOSHFR) increased significantly from 6% in the pre-crisis period to 10% in the crisis period. Investment Company holding (NOSHIC) decreased significantly from the pre-crisis period, when it was 29%, to 19% in the post-crisis period.

Table 6.1 Mean and Median Differences of Ownership Structure and Market Liquidity Variables during the pre, within and post crisis periods

Table 6.1 presents the mean and median differences of insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade Size (TZ), trading volume (VO), number of trades (NT) in the pre-, during and post-crisis periods. The pre-crisis period includes years 2004-2006, crisis period includes years 2007-2009, and post-crisis period includes years 2010-2012 for FTSE All-Share non-financial companies. See Table 3.2 for variables' definitions and measurements. ***,**,* represent significance at the 1%, 5% and 10% level, respectively.

Panel (A) Mean (Median) Differences Pre- and During Crisis Periods						
	Mean	**Median**	**Mean**	**Median**	**t-test**	**Wilcoxon rank -sum**
IO	0.09	0.01	0.11	0.02	-1.91*	-2.34**
LS	0.25	0.26	0.24	0.25	2.70***	2.68***
BKO	0.20	0.22	0.20	0.22	0.92	0.27
INSO	0.59	0.55	0.76	0.80	-24.70***	-17.67***
EO	0.06	0.001	0.08	0.006	-0.63	-1.62
NEO	0.03	0.002	0.03	0.002	-0.65	-0.83
NOSHCO	0.07	0.001	0.07	0.007	0.26	3.16***
NOSHEM	0.09	0.001	0.11	0.02	-0.88	1.04
NOSHGV	0.001	0.00	0.002	0.000	-1.39	-1.66*
NOSHIC	0.29	0.26	0.24	0.200	3.40***	5.01***
NOSHPF	0.02	0.007	0.009	0.005	5.83***	10.44***
NOSHFR	0.06	0.01	0.06	0.00	1.06	5.32***
NOSHFF	0.59	0.55	0.76	0.80	-24.70***	-17.67***
NOSHOF	0.01	0.00	0.01	0.00	-0.33	0.86
PBAS	0.024	0.009	0.015	0.001	8.94***	9.70***
PIMPACT	0.000	0.000	0.000	9.64E-06	0.08	5.17***
NT	280.74	54.88	769.87	280.08	-10.33***	-13.06***
TR	0.008	0.004	0.001	0.001	0.76	4.08***
TZ	11.33	5.97	5.17	2.95	6.97***	14.50***
VO	2903.34	524.58	3111.3	640.74	-1.69*	-3.80***
Panel (B) Mean (Median) Differences Pre- and Post-Crisis Periods						
IO	0.09	0.01	0.10	0.01	2.59***	1.48
LS	0.25	0.26	0.21	0.09	4.25***	2.99***
BKO	0.20	0.22	0.17	0.07	4.74***	4.00***
INSO	0.59	0.55	0.78	0.85	-7.12***	-8.01***
EO	0.06	0.001	0.07	0.007	1.80*	-0.61
NEO	0.03	0.002	0.02	0.002	1.62	1.57
NOSHCO	0.07	0.001	0.08	0.01	-1.01	-2.31**
NOSHEM	0.09	0.001	0.12	0.02	-0.87	-1.65*
NOSHGV	0.001	0.00	0.003	0.000	-2.59***	-5.02***
NOSHIC	0.29	0.26	0.19	0.08	4.73***	5.03***
NOSHPF	0.02	0.007	0.01	0.001	-10.95***	-11.25***
NOSHFR	0.06	0.01	0.10	0.06	-6.74***	-8.77***
NOSHFF	0.59	0.55	0.78	0.85	-7.12***	-8.01***
NOSHOF	0.01	0.00	0.01	0.00	2.06**	2.07**
PBAS	0.024	0.009	0.011	0.003	5.83***	8.42***
PIMPACT	0.000	0.000	0.000	0.000	-0.19	-6.87***
NT	280.74	54.88	933.67	343.44	-3.48***	-3.67***
TR	0.008	0.004	0.004	0.003	8.44***	12.51***
TZ	11.33	5.97	2.93	0.84	3.10***	12.24***
VO	2903.34	524.58	1714.89	437.18	6.75***	7.30***

Time Series Analysis

The mean, median and standard deviation of ownership level, concentration and owners' identity and market liquidity variables accounting for differences between years (i.e. year-to-year descriptive statistics) of the variables are used to examine the changes and directions of these variables during the study's period along with the mean of the pooled sample**.** In order to enable comparison between years means, together with the mean of the pooled sample, and to capture the changes in ownership percentage of holding, Table 6.2 presents the evolutions and trends of the averages of ownership level, concentration and owners' identity and market liquidity variables during the period of the study (i.e. 2003-2012).

As demonstrated in Table 6.2 and Figure 6.1, blockholders had gradually increased during the period of the study from 10.13% in 2003 to 14.09% in 2012, while blockholders reached their peak in 2007 and increased by 20.8% from 10.13 % to 20.58% by the end of 2007. However, they fell by around 21.5% in the following year. In addition, the largest shareholders increased from 20.91% in 2003 to 23.52 in 2007 and the institutional ownership increased gradually from 75.51% in 2003 to 80% in 2012 and insider ownership increased from 10.49% in 2003 to 12.25% in 2007. This increase might be related to the global financial and economic crisis in 2007 and due to compliance with the requirements of the UK Corporate Governance Code of 2006 and the Higgs review of 2003. With respect to owners' identity, Table 6.2 and Figures 6.2 and 6.3 show that the executive ownership increased from 7.8% in 2003 to 8.5% in 2007 and the non-executive ownership increased from 2.9% in 2003 to 3.6% in 2012. In contrast, pension find decreased from 2.39% in 2003 to 0.99% in 2007. Moreover, employee (NOSHEM), government (NOSHGV), and investment company (NOSHIC) decreased, whereas the free float shares increased during 2003-2012.

In order to enable comparison between years means, together with the mean of the pooled sample, and to capture the changes in the identity of ownership, Table 5.3 presents the evolutions and trends of the averages of the identity of ownership variables during the period of the study (i.e. 2003-2012). It is noticeable that executive ownership has gradually increased from 7.8% in 2003 to 8.3% in 2012, suggesting that more firms tend to hold more executive ownership. Conversely, the non-executive ownership reached a peak in 2007 then decreased slightly thereafter. A noticeable change has occurred during the period of the study in the firms' tendency to hold foreign ownership. In

2003, around 6.41% of firms in the sample hold foreign ownership. However, this average had increased from 6.42 to 12.23% by 2012. Finally, while no significant change was detected in the average of firms that hold government ownership during the period 2003-2012, this average had slightly increased during the years 2003-2012, from 0.19% to 0.39% in 2012. As shown in Table 6.2, in 2003 around 75% of firms were held by free float investors. However, this percentage dramatically increased to around 79.7% in 2012, suggesting that many firms tended to be held by ordinary investors. More interestingly, following a sustained period from 2004-2007 where disclosure quality seems to have been being improved, a significant sharp reversal in the disclosure quality occurred in 2008. This change in disclosure quality might be an epiphenomenal effect of the pressure that followed the year of the worst global financial crisis in living memory.

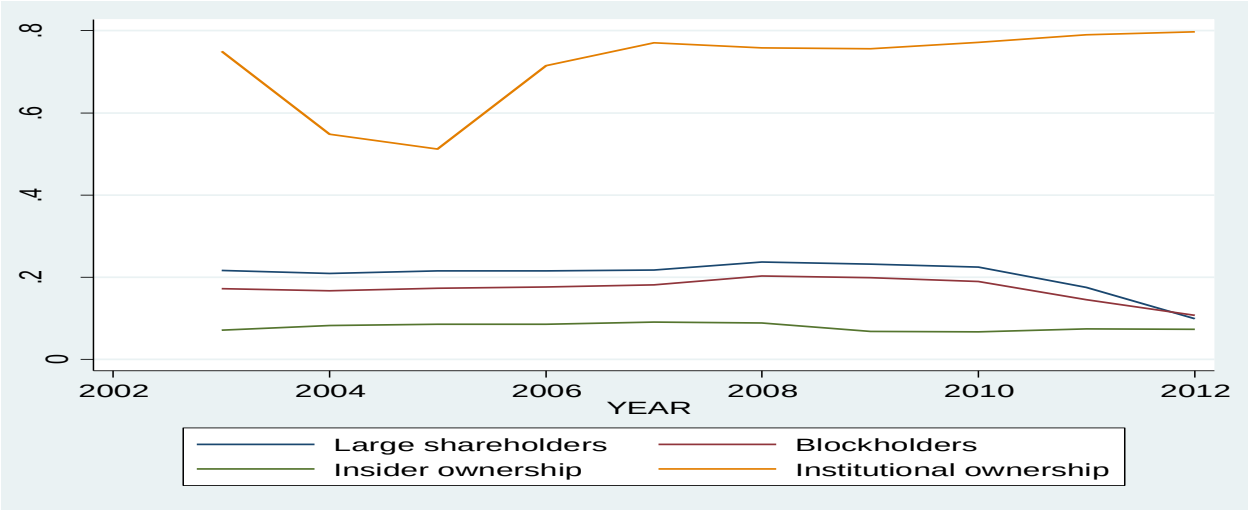

Figure 6.1 The Trends of the Ownership Level and Concentration Means during the Period 2003-2012

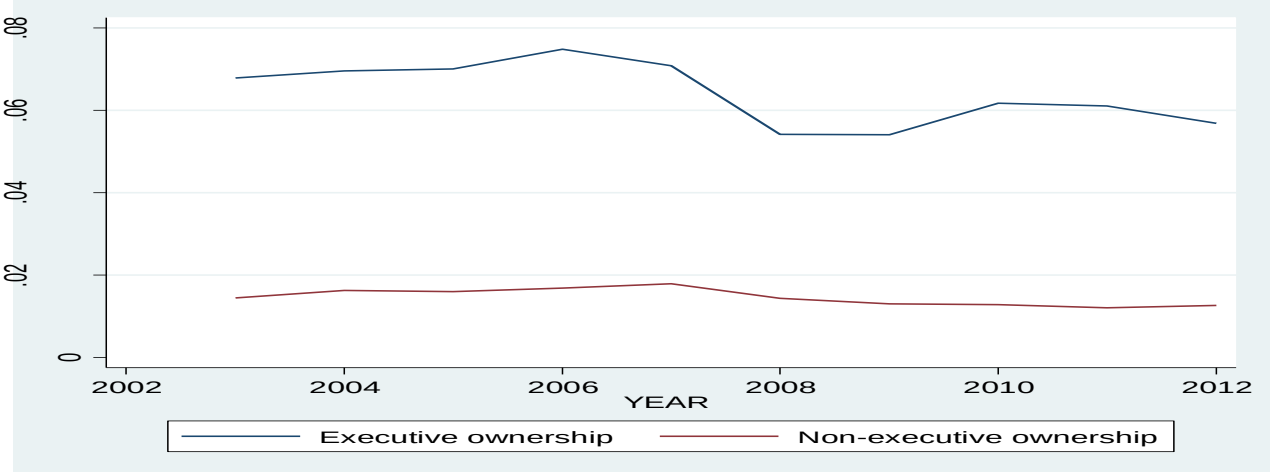

Figure 6.2 The Trends of the Insider's Identities of Ownership Means during the Period 2003-2012

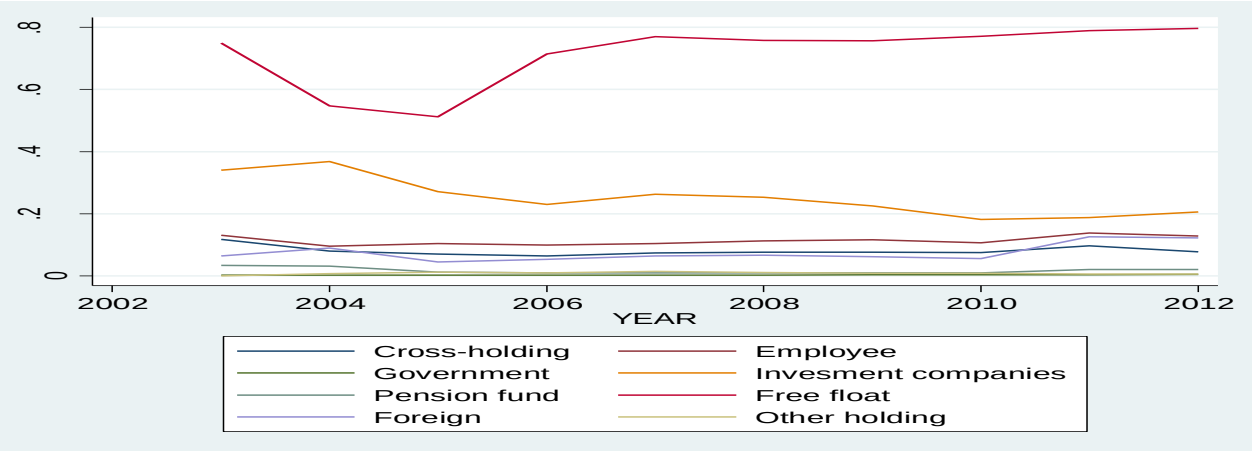

Figure 6.3 The Trends of the Outsider's Identities of Ownership Means during the Period 2003-2012

Additionally, proportional bid-ask spread (PBAS) shows some significant changes during the period under review. As shown in Table 6.2 it reached its peak in 2004 and decreased by 54% from 1.81% to 0.83%. Moreover, from Table 6.2 it can be seen that number of trades (NT) peaked in 2009 then dropped thereafter, whereas trading volume (VO) reached its highest value in 2007. Proportional bid-ask spread and price impact ratio have been stable in the last few years as an information friction of stock's market liquidity. However, the real friction of stock's market liquidity (e.g. turnover ratio, trading volume, trade size, and number of trades) decreased in the last few years.

Table 6.2 Descriptive Statistics Year by Year

Table 6.2 presents the time series average of cross-sectional means and standard deviations during the sample periods from December 2003 to December 2012 for UK companies. A brief description of the variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), turnover ratio (TR), price impact ratio (Pimpact), trade Size (TZ), trading volume (VO), and number of trades (NT). See Table 3.2 for variables' definitions and measurements.

Variables	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Pooled
VO	948.41 {2676.63}	2938.72 {7116.74}	2943.46 {6857.14}	2831.31 {6541.28}	3362.49 {6876.85}	3361.47 {6748.08}	2634.68 {5814.15}	2183.07 {5228.62}	1551.22 {3515.11}	1410.38 {3686.19}	2446.33 {5791.14}
PBAS	0.0181 {0.0238}	0.0301 {0.0260}	0.0233 {0.0267}	0.0199 {0.0229}	0.0169 {0.0242}	0.0154 {0.0211}	0.0134 {0.0212}	0.0134 {0.0200}	0.0106 {0.0195}	0.0083 {0.0158}	0.0166 {0.0229}
NT	603.26 {1190.12}	236.06 {592.77}	268.19 {566.91}	335.08 {621.91}	448.96 {861.98}	668.16 {1215.61}	1170.66 {1804.17}	926.72 {1599.76}	787.66 {1421.60}	1086.64 {1670.94}	670.80 {1298.07}
TZ	5.81 {13.15}	16.79 {19.54}	9.41 {11.40}	8.00 {10.33}	5.55 {6.54}	4.85 {5.84}	5.12 {29.51}	3.37 {7.86}	2.92 {6.54}	2.50 {6.88}	6.26 {14.31}
PIMPACT	0.0003 {0.0009}	0.0002 {0.0004}	0.0001 {0.0001}	0.0001 {0.0002}	0.0001 {0.0005}	0.0001 {0.0006}	0.0002 {0.0006}	0.0002 {0.0006}	0.0001 {0.0003}	0.0001 {0.0004}	0.0001 {0.0005}
IO	0.1049 {0.1887}	0.0888 {0.1754}	0.0879 {0.1683}	0.1014 {0.1776}	0.1225 {0.2006}	0.1241 {0.2072}	0.0974 {0.1837}	0.0963 {0.1807}	0.1063 {0.1968}	0.1040 {0.1935}	0.1035 {0.1879}
LS	0.2091 {0.2103}	0.2526 {0.2129}	0.2530 {0.2055}	0.2537 {0.2030}	0.2352 {0.2088}	0.2423 {0.2080}	0.2449 {0.2099}	0.2412 {0.2079}	0.2284 {0.2070}	0.1737 {0.1994}	0.2336 {0.2081}

Variables	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Pooled
BKO	0.1013 {0.1537}	0.2041 {0.1873}	0.2118 {0.1829}	0.2055 {0.1801}	0.2058 {0.1854}	0.2076 {0.1792}	0.2068 {0.1815}	0.1996 {0.1820}	0.1727 {0.1782}	0.1409 {0.1712}	0.1880 {0.1815}
EO	0.0788 {0.1675}	0.0656 {0.1530}	0.0690 {0.1543}	0.0696 {0.1443}	0.0851 {0.1648}	0.0791 {0.1630}	0.0775 {0.1658}	0.0760 {0.1649}	0.0770 {0.1677}	0.0832 {0.1701}	0.0762 {0.1616}
NEO	0.0294 {0.0805}	0.0304 {0.0828}	0.0331 {0.0925}	0.0314 {0.0897}	0.0369 {0.0977}	0.0332 {0.0911}	0.0309 {0.0911}	0.0279 {0.0865}	0.0292 {0.0892}	0.0269 {0.0872}	0.0309 {0.0891}
NOSHEM	0.1300 {0.2245}	0.0948 {0.1825}	0.1041 {0.1963}	0.0992 {0.1818}	0.1043 {0.1889}	0.1120 {0.2059}	0.1156 {0.1984}	0.1061 {0.1875}	0.1374 {0.2151}	0.1276 {0.2096}	0.1130 {0.1990}
NOSHGV	0.0019 {0.0079}	0.0019 {0.0078}	0.0015 {0.0063}	0.0015 {0.0063}	0.0016 {0.0064}	0.0020 {0.0085}	0.0029 {0.0184}	0.0033 {0.0191}	0.0035 {0.0192}	0.0039 {0.0191}	0.0025 {0.0136}
NOSHIC	0.3402 {0.2037}	0.3681 {0.1900}	0.2710 {0.1919}	0.2293 {0.2195}	0.2623 {0.2600}	0.2528 {0.2454}	0.2250 {0.2383}	0.1809 {0.2051}	0.1874 {0.2091}	0.2061 {0.1881}	0.2473 {0.2238}
NOSHPF	0.0339 {0.0261}	0.0316 {0.0508}	0.0117 {0.0507}	0.0099 {0.0205}	0.0099 {0.0206}	0.0096 {0.0203}	0.0091 {0.0198}	0.0092 {0.0201}	0.0205 {0.0260}	0.0204 {0.0255}	0.0159 {0.0311}
NOSHFF	0.7500 {0.1878}	0.5476 {0.1129}	0.5118 {0.1170}	0.7146 {0.1417}	0.7702 {0.1572}	0.7583 {0.1649}	0.7563 {0.1686}	0.7716 {0.1686}	0.7899 {0.1714}	0.7971 {0.1732}	0.7196 {0.1842}
NOSHFR	0.0641 {0.0765}	0.0891 {0.1033}	0.0450 {0.0956}	0.0530 {0.1032}	0.0636 {0.1237}	0.0659 {0.1394}	0.0616 {0.1360}	0.0549 {0.1281}	0.1252 {0.1495}	0.1223 {0.1391}	0.0754 {0.1263}
NOSHOF	0.0000 {0.0000}	0.0072 {0.0547}	0.0118 {0.0602}	0.0088 {0.0526}	0.0142 {0.0763}	0.0104 {0.0741}	0.0085 {0.0670}	0.0084 {0.0663}	0.0058 {0.0533}	0.0057 {0.0534}	0.0083 {0.0604}

6.4. Empirical Results

This section provides the empirical results on the relationship between ownership level, concentration and owners' identity and market liquidity pre, during and posts the recent financial crisis 2007-2009. The first part presents the main regression analysis on the effect of ownership level and concentration on market liquidity pre, within and post crisis. The second part presents the main regression analysis on the effect of owners' identity on market liquidity within these sub-periods.

As indicated previously, the period of the study is divided into three sub-periods, pre-crisis (2004-2006), crisis period (2007-2009) and post-crisis period (2010-2012). Following Poon et al. (2013), this study runs the pooled OLS industry and year dummies in the main analysis. Poon et al. (2013) argue that this method controls for the endogeneity problem. Therefore, and to control for the effect of endogeneity, the empirical strategy includes several steps to minimise the effect of such an issue in the estimation. First, following Brockman et al. (2009), this study controls for simultaneity by introducing the "lagged values" of the ownership variables. Second, to control for unobservable heterogeneity, this study follows Poon et al. (2013) and includes year and industry fixed effects by introducing dummies for each year and each industry within the non- financial sectors. Finally, this study estimates robust the standard errors to control for serial correlation and heteroscedasticity using the option "Robust" in STATA 11.

Table 6.3 Panel A and B present our pooled OLS clustered regression results on the relationship between ownership level, concentration and market liquidity. To alleviate concerns about endogeneity and spurious inferences, this study includes in all pooled-sample regressions the control variables that the literature identifies as important determinants of market liquidity. All model specifications include industry fixed effects to control for time-invariant omitted industry-level factors that affect liquidity. The study also includes year effects to control for cross-sectional dependence; that is, market-wide factors that affect a stock's market liquidity. The study reported t-statistics values are based on heteroscedasticity-robust standard errors, clustered at the firm level. Clustering the errors at the firm level allows us to control for time-series dependence.

Table 6.3 presents the main results using the pooled OLS industry and year dummies. Panel (A) reports the results for the effect of ownership level, concentration on market liquidity using proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) as dependent variables, while Panel (B) reports the results for the real friction of market liquidity (i.e., trading activity). The findings reveal a significantly negative relationship between insider ownership and market liquidity during the 2007-2009 financial crisis. However, insignificantly negative relationship is also observed between insider ownership and trade size (TZ) in the pre-crisis and insignificantly negative relationship between insider ownership and number of trades (NT) and turnover ratio (TR) in post-crisis period. The findings for total liquidity costs and real friction of market liquidity suggest that insider ownership is marginally negative in both the pre-crisis and post-crisis periods. Accordingly, $\boldsymbol{H_{1a}}$, and $\boldsymbol{H_{1c}}$ are rejected, whereas $\boldsymbol{H_{1b}}$ is accepted. The results with respect to the 2007-2009 financial crisis periods in this chapter are consistent with the results reported in Chapter 4.

Regarding ownership concentration, Table 6.3 shows that the relationship between blockholders and proportional bid-ask spread and price impact ratio is insignificantly negative. This insignificantly negative relationship is found in the pre-crisis, crisis and post-crisis periods. These results are inconsistent with our findings in Chapter 4 for UK firms specifically: an increase in blockholders neither decreases or increase market liquidity in the three sub-periods. The same patterns hold for larger shareholders. Moreover, Table 6.3 shows that the relationship between large shareholders and market liquidity is insignificantly negative. These findings are inconsistent with the adverse selection hypothesis (Brockman et al., 2009; Rubin 2007). This leads us to reject $\boldsymbol{H_{2a}}$, $\boldsymbol{H_{2b}}$ and $\boldsymbol{H_{2c}}$, which state that there is negative relationship between ownership concentration and market liquidity in the three sub-periods.

However, with respect to institutional ownership Table 6.3 shows that it has an insignificant positive impact on market liquidity that is inconsistent with the trading hypothesis (Rubin 2007). According to this hypothesis, institutional investors trade more often than other investors (i.e., insiders). Taken together, the findings from Table 6.3 in both Panels reject $\boldsymbol{H_{3a}}$, $\boldsymbol{H_{3b}}$ and $\boldsymbol{H_{3c}}$, which state that there is a positive relationship between institutional ownership and market liquidity. To the best of the author's knowledge, no empirical papers can be found with which to compare our results, i.e. examine the impact of ownership level and concentration on market liquidity. However, the insignificantly positive relationship between institutional ownership and market liquidity is

consistent with Poon et al. (2013) who document that in order to en-cash their position institutional investors herd when the market is down.

Table 6.3a Pooled OLS Regression Results on the Relationship between Ownership Level and Concentration and Total Market Liquidity

Table 6.3a presents results of the effect of ownership level and concentration on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$ .....(1a and 1a)

$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \gamma_4 TZ_{it} + \gamma_5 NT_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$ .....(1b and 2b)

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), Price impact ratio (Pimpact), trade size (TZ), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) Dummies. See Table 3.2 for variables' definitions and measurements.

Panel A The Effect of Ownership Level and Concentration on Total Cost of Market Liquidity

	Pre-Crisis				Within Crisis				Post-Crisis			
	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**
Insider ownership	0.07 (3.15)***	0.03 (1.57)	0.33 (5.92)***	0.23 (4.71)***	0.03 (1.66)*	0.03 (1.84)*	0.27 (5.59)***	0.21 (4.73)***	0.03 (1.19)	0.04 (2.04)**	0.28 (6.06)***	0.23 (5.61)***
Large Shareholders	0.11 (2.96)***	0.10 (3.24)***	0.00 (0.01)	0.01 (0.17)	0.03 (1.06)	0.01 (0.27)	0.02 (0.34)	0.02 (0.38)	0.10 (2.44)**	0.07 (1.98)**	0.02 (0.37)	0.01 (0.18)
Blockholders	0.01 (0.14)	0.01 (0.53)	0.09 (1.04)	0.04 (0.54)	0.02 (0.69)	0.02 (0.74)	0.06 (0.90)	0.05 (0.85)	0.08 (1.90)*	0.04 (1.17)	0.13 (1.94)*	0.10 (1.64)
Institutional Ownership	-0.07 (-0.38)	-0.03 (-0.20)	-0.12 (-0.28)	-0.04 (-0.14)	-0.26 (-1.08)	-0.12 (-0.64)	-0.67 (-1.37)	-0.46 (-1.14)	-0.02 (-0.10)	-0.03 (-0.18)	-1.03 (-2.60)***	-0.77 (-2.34)**
Market Value	-0.20 (-9.09)***	-0.11 (-5.52)***	-0.52 (-9.70)***	-0.33 (-5.99)***	-0.20 (-8.68)***	-0.12 (-5.61)***	-0.50 (-11.65)***	-0.37 (-9.51)***	-0.22 (-8.35)***	-0.10 (-4.99)***	-0.38 (-7.67)***	-0.25 (-5.18)***
Volatility	0.15 (3.09)***	0.18 (4.25)***	0.04 (0.40)	0.12 (1.37)	0.04 (0.89)	0.04 (1.03)	0.16 (1.46)	0.15 (1.49)	0.15 (3.18)***	0.06 (1.78)*	0.16 (1.92)*	0.14 (1.75)*
Share price	-0.07 (-2.47)**	-0.04 (-1.50)	0.14 (2.02)**	0.20 (3.17)***	-0.06 (-2.28)**	-0.02 (-3.38)***	0.08 (1.75)*	0.08 (1.79)*	-0.14 (-4.34)***	-0.03 (-1.33)	0.02 (0.32)	0.01 (0.23)
Trade Size	-	0.02 (0.84)	-	-0.10 (-1.53)	-	0.07 (2.58)***	-	-0.26 (-3.71)***	-	0.18 (5.94)***	-	-0.26 (-4.02)***
Number of Trades	-	-0.20 (-9.12)***	-	-0.49 (-9.37)***	-	-0.22 (-8.53)***	-	-0.39 (-7.87)***	-	-0.26 (-12.00)***	-	-0.39 (-8.68)***
Constant	-0.65 (-5.77)***	-0.72 (-7.45)***	-2.56 (-8.67)***	-2.51 (-9.74)***	-1.17 (-9.71)***	-1.11 (-10.01)***	-3.01 (-12.56)***	-2.55 (-11.68)***	-0.99 (-6.56)***	-0.98 (-8.21)***	-2.75 (-11.00)***	-2.19 (-9.13)***
Adjusted R^2	**0.42**	**0.51**	**0.44**	**0.55**	**0.37**	**0.49**	**0.43**	**0.50**	**0.46**	**0.61**	**0.41**	**0.49**
Number of Observations	588	588	588	588	588	588	588	588	588	588	588	588

Table 6.3b Pooled OLS Regression Results on the Relationship between Ownership Level and Concentration and Real Friction of Market Liquidity

Table 6.3b presents results of the effect of ownership level and concentration on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it} = \alpha_0 + \beta_1 IO_{it} + \beta_2 INSO_{it} + \beta_3 BKO_{it} + \beta_4 LS_{it} + \gamma_1 MV_{it} + \gamma_2 P_{it} + \gamma_3 VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$$

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), trade size (TZ), number of trades (NT), trading volume (VO) and turnover ratio (TR), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) Dummies. See Table 3.2 for variables' definitions and measurements.

Panel B The Effect of Ownership Level and Concentration on Real Friction of Market Liquidity

	Pre-Crisis				Within Crisis				Post-Crisis			
	NT	**TSIZE**	**TR**	**VO**	**NT**	**TSIZE**	**TR**	**VO**	**NT**	**TSIZE**	**TR**	**VO**
Insider Ownership	-0.20 (-4.42)***	-0.01 (-0.46)	-0.05 (-2.47)**	-0.28 (-5.39)***	-0.06 (-1.48)	-0.14 (-4.14)***	-0.05 (-2.76)***	-0.18 (-3.69)***	-0.03 (-0.88)	-0.12 (-3.57)***	-0.01 (-0.80)	-0.19 (-4.60)***
Large Shareholder	-0.03 (-0.45)	-0.02 (-0.52)	-0.01 (-0.13)	-0.12 (-1.65)*	-0.16 (-2.18)**	-0.06 (-1.54)	-0.02 (-0.37)	-0.05 (-0.65)	-0.05 (-0.91)	-0.03 (-0.80)	-0.02 (-0.98)	-0.01 (-0.16)
Blockholders	-0.11 (-1.49)	-0.01 (-0.04)	-0.02 (-0.57)	-0.01 (-0.10)	-0.01 (-0.14)	-0.02 (-0.55)	-0.01 (-0.19)	-0.07 (-0.88)	-0.10 (-1.52)	-0.04 (-0.78)	-0.02 (-0.57)	-0.15 (-1.87)*
Institutional Ownership	0.18 (0.43)	0.10 (0.36)	0.25 (0.98)	0.11 (0.23)	0.58 (1.26)	0.08 (0.28)	0.48 (1.91)*	0.54 (1.18)	0.44 (1.11)	0.32 (1.11)	0.80 (3.47)***	0.97 (2.37)**
Market Value	0.39 (8.54)***	-0.02 (-0.98)	0.07 (4.20)***	0.41 (9.93)***	0.35 (8.21)***	-0.06 (-2.96)***	0.08 (4.05)***	0.40 (8.58)***	0.37 (8.31)***	-0.07 (-2.62)***	0.02 (1.01)	0.26 (6.11)***
Volatility	0.14 (1.73)*	0.05 (0.62)	0.19 (4.02)***	0.10 (1.06)	0.01 (0.04)	-0.01 (-0.28)	0.10 (1.82)*	0.11 (1.40)	-0.17 (-2.11)**	0.19 (3.90)***	0.11 (3.09)***	-0.07 (-0.83)
Share Price	0.15 (2.63)***	-0.19 (-5.46)***	0.01 (0.08)	-0.14 (-2.19)**	0.13 (2.94)***	-0.21 (-5.90)***	0.01 (0.01)	-0.11 (-1.95)*	0.20 (4.03)***	-0.31 (-8.80)***	0.01 (0.23)	-0.03 (-0.67)
Constant	-0.18 (-0.76)	1.38 (8.39)***	-2.76 (-22.71)***	1.12 (4.50)***	0.58 (2.23)**	0.88 (4.72)***	-2.45 (-19.90)***	1.81 (6.92)***	0.73 (2.84)***	1.00 (5.53)***	-2.25 (-19.37)***	1.65 (7.23)***
Adjusted R^2	0.36	0.10	0.18	0.34	0.39	0.28	0.13	0.35	0.39	0.34	0.12	0.30
Number of Observations	588	588	588	588	588	588	588	588	588	588	588	588

Table 6.4 presents the main results using the pooled OLS industry and year dummies. Panel (A) reports the results for the effect of owners' identity on market liquidity using proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) as dependent variables, while Panel (B) reports the results for the real friction of market liquidity (i.e., trading activity). The findings for both total liquidity costs and real friction of market liquidity suggest that the executive and non-executive director's ownership are insignificantly correlated with market liquidity in the pre-crisis, crisis and post-crisis periods. Nevertheless, Table 6.4 Panel A reveals an insignificantly positive relationship between executive and non-executive directors' ownership and the proportional bid-ask spread during the crisis period. Moreover, Table 6.4 Panel B shows insignificantly negative relationship between executive and non-executive directors' ownership and trade size (TZ) and turnover ratio (TR) in the pre-crisis period. This would mean that in the pre-crisis and crisis periods the executive and non-executive directors' ownership have a marginally negative impact on market liquidity. Accordingly, $\boldsymbol{H_{4a}}$ and $\boldsymbol{H_{4b}}$ are rejected whereas $\boldsymbol{H_{4c}}$ is accepted. It is therefore, noted that the post-crisis period's results reported in this chapter are consistent with the results reported in Chapter 5.

With respect to the outsider ownership identities, Table 6.4 Panel A reveals an insignificantly positive relationship between pension fund ownership (NOSHPF) and price impact ratio in the crisis and post-crisis periods. Moreover, Table 6.4 Panel A shows an insignificantly positive relationship between NOSHPF and price impact ratio during the crisis and post-crisis periods. This means that during the pre-crisis and crisis periods the pension fund ownership has a marginally positive impact on the total cost of market liquidity. Moreover, Table 6.4 Panel B reveals an insignificantly negative relationship between NOSHPF and trade size (TZ) in the pre-crisis, within crisis and post crisis periods. Regarding foreign ownership (NOSHFR), Table 6.4 Panel A reveals, an insignificantly positive relationship between NOSHFR and the proportional bid-ask spread (PBAS) in the pre-crisis, within crisis and post-crisis periods. Moreover, Table 6.4 Panel B shows an insignificantly negative relationship between NOSHFR and trade size (TZ), number of trade (NT) and turnover ratio in the pre, within and post-crisis periods. This means that in the pre, within and post-crisis foreign ownership has a marginally negative impact on market liquidity. Accordingly, $\boldsymbol{H_{4a}}$, $\boldsymbol{H_{4b}}$ and $\boldsymbol{H_{4c}}$ are accepted.

With respect to investment banks ownership (NOSHIC), Table 6.4 Panel A reveals an insignificantly positive relationship between NOSHIC and the proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) in the pre-crisis, within crisis and post-crisis periods. Moreover, Table 6.4 Panel B shows an insignificantly negative relationship between NOSHIC and trade size (TZ), trading volume (VO) and turnover ratio in the pre-crisis and within crisis period. This means that investment banks' ownership has a marginally negative impact on market liquidity. Regarding government ownership (NOSHGV), Table 6.4 Panel A reveals an insignificantly positive relationship between NOSHGV and the proportional bid-ask spread (PBAS) in the pre and post-crisis periods. Moreover, Table 6.4 Panel B shows an insignificantly negative relationship between NOSHGV and trade size (TZ) and trading volume (VO) in the pre and post-crisis periods. This means that government ownership has a marginally negative impact on market liquidity in the pre and post-crisis period.

With respect to cross-holding ownership (NOSHCO), Table 6.4 Panel A reveals an insignificantly positive relationship between NOSHCO and the proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) in the pre-crisis, within crisis and post-crisis periods. Moreover, Table 6.4 Panel B shows an insignificantly negative relationship between NOSHCO and trade size (TZ), trading volume (VO), number of trade (NT) and turnover ratio (TR) in the pre-crisis and post-crisis periods. However, Table 6.4 Panel B shows that in both the pre-crisis and post crisis periods, there is an insignificantly negative relationship between NOSHCO and trading volume. This means that cross-holdings ownership has a marginally negative impact on market liquidity. With respect to employee ownership (NOSHEM), Table 6.4 Panel A reports an insignificantly positive relationship between employee ownership and proportional bid-ask spread and price impact ratio in the pre-crisis and within the crisis periods. Moreover, Table 6.4 Panel B reports insignificant negative relationship between employee ownership and real friction of market liquidity (i.e. trade size, number of trade, turnover ratio and trading volume) in the pre-crisis, within crisis and post crisis periods. Regarding other holdings (NOSHOF) Table 6.4 Panel A and B reveal an insignificantly positive relationship between NOSHOF and proportional bid-ask spread (PBAS) and price impact ratio (Pimact) in the pre-crisis period, and insignificantly negative relationship between NOSHOF and number of trades (NT), trading volume (VO) and turnover ratio (TR) in the pre-crisis, within crisis and post crisis periods.

Finally, with respect to the free float shares to the author's knowledge few studies in the ownership-liquidity relationship take into consideration the free float as one of the determinants of market liquidity. The results in Table 6.4 reveal show an insignificantly positive relationship between market liquidity and free float shares (NOSHFF). Specifically, Table 6.4 Panel A shows an insignificantly negative relationship between NOSHFF and proportional bid-ask spread (PBAS) in the post-crisis period. Table 6.4 Panel B also show an insignificantly positive relationship between NOSHFF and the turnover ratio in the both pre-crisis and crisis periods. Moreover, this study reports a insignificantly positive relationship between free floats and number of trades (NT) in crisis and post crisis periods The sub-samples results presented in this chapter are inconsistent with the results reported in Chapter 5, which specifies the impact of the recent financial crisis on the sample firms, included in this research.

Table 6.4a Pooled OLS Regression Results on the Relationship between Owners' Identity and Total Market Liquidity

Table 6.4a presents results of the effect of owners identity on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOSHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \quad \text{(1a and 2a)}$$

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOSHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\gamma_4 TZ_{it}+\gamma_5 NT_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i \quad \text{(1b and 2b)}$$

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), price impact ratio (Pimpact), trade size (TZ), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) dummies. The t-statistics are reported in parentheses. See Table 3.2 for variables' definitions.

Panel A The Relationship between Owners' Identity and Total Liquidity Costs												
	Pre-Crisis				**Within Crisis**				**Post Crisis**			
	PBAS (1a)	**PBAS (2a)**	**Pimpact (1b)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (2a)**	**Pimpact (1b)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (2a)**	**Pimpact (1b)**	**Pimpact (2b)**
EO	0.05 (3.08)***	0.02 (1.32)	0.23 (6.18)***	0.16 (4.52)***	0.02 (0.67)	0.04 (1.52)	0.06 (2.09)**	0.01 (0.06)	0.08 (3.04)***	0.07 (2.71)***	0.11 (3.78)***	0.06 (2.00)**
NEO	0.08 (4.29)***	0.05 (3.17)***	0.18 (4.81)***	0.13 (3.79)***	0.03 (1.11)	0.05 (1.76)*	0.16 (5.32)***	0.11 (3.76)***	0.10 (3.92)***	0.10 (3.78)***	0.19 (5.87)***	0.13 (4.17)***
NOSHCO	0.01 (0.09)	0.01 (0.44)	0.02 (0.66)	0.01 (0.42)	0.01 (0.19)	0.03 (1.14)	0.08 (2.84)***	0.07 (2.44)**	0.01 (0.47)	0.01 (0.56)	0.04 (1.33)	0.02 (0.76)
NOSHEM	0.01 (0.08)	0.01 (0.05)	0.01 (0.12)	0.01 (0.20)	0.01 (0.25)	0.01 (0.26)	0.02 (0.48)	0.02 (0.61)	0.05 (2.16)**	0.05 (2.03)**	0.01 (0.31)	0.01 (0.35)
NOSHGV	0.02 (1.17)	0.01 (0.50)	0.08 (2.51)**	0.03 (0.88)	0.05 (2.16)**	0.04 (1.79)*	0.06 (2.26)**	0.08 (3.03)***	0.02 (1.02)	0.02 (0.91)	0.02 (0.87)	0.01 (0.34)
NOSHIC	0.08 (1.97)**	0.11 (2.75)***	-0.05 (-1.53)	0.09 (1.22)	0.02 (0.42)	0.03 (0.76)	0.05 (1.09)	0.05 (0.99)	0.04 (0.94)	0.06 (1.44)	0.01 (0.19)	0.02 (0.33)
NOSHPF	0.07 (2.30)**	0.03 (1.24)	0.23 (3.80)***	0.15 (2.82)***	0.07 (2.01)**	0.06 (1.76)*	0.01 (0.05)	0.01 (0.24)	0.07 (2.29)**	0.07 (2.35)**	0.01 (0.46)	0.01 (0.17)
NOSHFR	0.04 (1.08)	0.03 (1.10)	0.16 (2.53)**	0.16 (2.70)***	0.09 (0.42)	0.03 (0.18)	0.30 (1.33)	0.35 (1.67)*	0.33 (0.89)	0.28 (0.75)	0.13 (2.27)**	0.04 (0.09)
NOSHOF	0.13 (1.34)	0.09 (0.99)	0.32 (1.55)	0.25 (1.34)	0.11 (3.13)***	0.11 (3.22)***	0.23 (6.14)***	0.13 (3.58)***	0.09 (2.99)***	0.09 (3.00)***	0.11 (2.96)***	0.06 (1.76)*
NOSHFF	-0.58 (-2.97)***	-0.43 (-2.40)**	-0.89 (-2.23)**	-0.62 (-1.69)*	0.11 (1.99)**	0.10 (1.82)*	-0.10 (-1.74)*	-0.02 (-0.25)	-0.03 (-0.55)	-0.03 (-0.64)	-0.13 (-2.27)**	-0.09 (-1.59)
Market value	-0.19 (-9.43)***	-0.12 (-5.93)***	-0.47 (-11.39)***	-0.32 (-7.88)***	-0.31 (-4.51)***	-0.20 (-2.92)***	0.08 (1.12)	0.13 (1.95)*	-0.23 (-3.83)***	-0.19 (-3.19)***	0.01 (0.19)	0.01 (0.14)
Volatility	0.21 (4.24)***	0.21 (4.77)***	0.14 (1.42)	0.17 (1.85)*	-0.37 (-5.67)***	-0.28 (-4.14)***	-0.39 (-5.71)***	-0.16 (-2.37)**	-0.30 (-5.03)***	-0.31 (-5.15)***	-0.28 (-4.04)***	-0.15 (-2.14)**
Share Price	-0.09 (-3.50)***	-0.05 (-1.98)**	0.13 (2.53)**	0.18 (3.81)***	0.06 (1.68)*	0.13 (3.49)***	0.24 (5.89)***	0.16 (3.98)***	0.04 (1.35)	0.07 (2.06)**	0.26 (6.03)***	0.20 (4.66)***
Trade Size	-	0.03 (1.08)	-	-0.09 (-1.63)	-	0.01 (0.40)	-	-0.33 (-10.06)***	-	0.03 (1.21)	-	-0.24 (-6.61)***
Number of trades	-	-0.21 (-9.87)***	-	-0.44 (-10.35)***	-	-0.33 (-6.85)***	-	0.12 (2.42)**	-	-0.21 (-3.92)***	-	0.10 (1.61)
Constant	-0.56 (-4.59)***	-0.73 (-6.09)***	-2.06 (-8.18)***	-2.20 (-8.99)***	0.61 (4.81)***	0.27 (2.03)**	0.30 (2.24)**	0.26 (1.91)*	1.57 (10.88)***	1.14 (6.18)***	0.24 (1.43)	0.28 (1.32)
Industry	Yes	yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Year	Yes	yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Adjusted R2	0.41	0.50	0.47	0.63	0.33	0.37	0.57	0.55	0.27	0.28	0.40	0.44
Number of Observations	592	592	592	592	592	592	592	592	592	592	592	592

Table 6.4b Pooled OLS Regression Results on the Relationship between Owners' Identity and Real Friction of Market Liquidity

Table 6.4b presents results of the effect of owners identity on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$LIQ_{it}=\alpha_0+\beta_1 EO_{it}+\beta_2 NEO_{it}+\beta_3 NOHFF_{it}+\beta_4 NOSHIC_{it}+\beta_5 NOSHOF_{it}+\beta_6 NOSHPF_{it}+\beta_7 NOSGV_{it}+\beta_8 NOSHEM_{it}+\beta_9 NOSHCO_{it}+\beta_{10} NOSHFR_{it}+\gamma_1 MV_{it}+\gamma_2 P_{it}+\gamma_3 VOL_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i$$

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), turnover ratio (TR), trade size (TZ), trading volume (VO), and number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) dummies. The t-statistics are reported in parentheses. See Table 3.2 for variables' definitions.

Panel B The Relationship between Owners' Identity and Real Friction of Market Liquidity												
	Pre- Crisis				**Within Crisis**				**Post- Crisis**			
	NT	**TSIZE**	**VO**	**TR**	**NT**	**TSIZE**	**VO**	**TR**	**NT**	**TSIZE**	**VO**	**TR**
EO	-0.16 (-4.79)***	-0.01 (-0.17)	-0.20 (-5.48)***	-0.02 (-1.10)	-0.08 (-3.70)***	-0.21 (-6.44)***	-0.13 (-4.48)***	-0.14 (-6.39)***	-0.27 (-2.61)***	-0.23 (-7.23)***	-0.14 (-4.42)***	-0.14 (-6.98)***
NEO	-0.11 (-3.37)***	-0.02 (-0.91)	-0.13 (-3.41)***	-0.04 (-2.79)***	-0.06 (-2.78)***	-0.18 (-5.39)***	-0.04 (-1.48)	-0.11 (-5.21)***	-0.03 (-2.01)**	-0.23 (-7.13)***	-0.02 (-1.63)	-0.12 (-5.87)***
NOSHCO	-0.03 (-0.77)	-0.01 (-0.49)	-0.02 (-0.65)	-0.01 (-0.89)	-0.08 (-3.71)***	-0.07 (-2.36)**	-0.01 (-0.36)	-0.04 (-2.15)**	-0.02 (-1.41)	-0.08 (-2.68)***	-0.01 (-0.26)	-0.01 (-0.42)
NOSHEM	-0.01 (-0.12)	-0.01 (-0.28)	-0.04 (-1.23)	-0.01 (-0.82)	-0.01 (-0.01)	-0.01 (-0.26)	-0.01 (-0.36)	-0.02 (-1.12)	-0.02 (-1.10)	-0.01 (-0.40)	-0.02 (-0.62)	-0.03 (-1.58)
NOSHGV	-0.13 (-4.23)***	-0.01 (-0.27)	-0.01 (-0.14)	-0.03 (-2.15)**	-0.03 (-1.55)	-0.04 (-1.16)	-0.05 (-1.79)*	-0.02 (-0.79)	-0.04 (-1.08)	-0.05 (-2.12)**	-0.07 (-2.51)**	-0.03 (-1.69)*
NOSHIC	-0.12 (-1.48)	-0.01 (-0.01)	-0.02 (-0.20)	-0.04 (-1.04)	-0.18 (-4.56)***	-0.09 (-1.51)	-0.03 (-1.62)	-0.05 (-1.35)	-0.11 (-3.71)***	-0.07 (-1.45)	-0.17 (-3.02)***	-0.09 (-2.66)***
NOSHPF	-0.16 (-2.97)***	-0.01 (-0.08)	-0.21 (-3.57)***	-0.06 (-2.49)**	-0.03 (-1.16)	-0.01 (-0.20)	-0.04 (-1.21)	-0.09 (-3.65)***	-0.04 (-1.67)*	-0.05 (-1.33)	-0.04 (-1.10)	-0.04 (-1.82)*
NOSHFR	-0.01 (-0.14)	-0.01 (-0.19)	-0.08 (-1.28)	-0.05 (-1.94)*	-0.15 (-0.95)	-0.09 (-0.38)	-0.09 (-0.44)	-0.14 (-0.92)	-0.34 (-1.31)	-0.48 (-1.07)	-0.49 (-1.04)	-0.24 (-1.30)
NOSHOF	-0.18 (-0.98)	-0.17 (-1.20)	-0.52 (-2.56)**	-0.14 (-1.62)	-0.01 (-0.02)	-0.30 (-7.33)***	-0.13 (-0.52)	-0.03 (-1.18)	-0.03 (-1.37)	-0.20 (-5.18)***	-0.03 (-0.87)	-0.02 (-0.79)
NOSHFF	0.66 (1.83)*	0.27 (1.00)	0.81 (2.07)**	0.04 (0.23)	0.27 (1.59)	0.26 (3.96)***	0.15 (2.48)**	0.05 (1.14)	0.01 (0.37)	0.18 (2.99)***	0.05 (0.86)	0.01 (0.16)
Market value	0.34 (9.18)***	-0.03 (-1.02)	0.39 (9.59)***	0.06 (3.64)***	0.33 (6.27)***	0.28 (3.61)***	0.04 (0.62)	-0.06 (-1.25)	0.18 (4.34)***	0.06 (0.83)	-0.17 (-2.20)**	0.18 (3.70)***
Volatility	0.04 (0.53)	0.07 (1.06)	0.03 (0.27)	0.18 (4.13)***	0.28 (5.52)***	0.77 (10.33)***	-0.07 (-1.07)	0.05 (1.16)	0.02 (0.45)	0.55 (7.63)***	-0.13 (-1.86)*	0.31 (6.64)***
Share Price	0.16 (3.57)***	-0.19 (-5.57)***	-0.12 (-2.55)**	0.02 (0.68)	0.21 (6.89)***	-0.17 (-3.87)***	0.08 (2.09)**	-0.09 (-3.33)***	0.08 (3.37)***	-0.21 (-4.77)***	0.02 (0.55)	-0.05 (-1.96)**
Constant	-0.59 (-2.59)***	1.36 (7.91)***	0.70 (2.82)***	-2.89 (-26.15)***	-1.05 (-10.49)***	-0.49 (-3.37)***	-0.95 (-7.10)***	0.18 (1.88)*	-2.08 (-20.72)***	-0.71 (-4.13)***	-1.07 (-5.93)***	0.31 (2.80)***
Industry	*Yes*	*yes*	*yes*	*Yes*	*yes*	*Yes*	*Yes*	*yes*	*yes*	*yes*	*yes*	*Yes*
Year	*Yes*	*yes*	*yes*	*Yes*	*yes*	*Yes*	*Yes*	*yes*	*yes*	*yes*	*yes*	*Yes*
Adjusted R^2	**0.38**	**0.07**	**0.33**	**0.18**	**0.31**	**0.05**	**0.13**	**0.24**	**0.05**	**0.57**	**0.11**	**0.32**
Number of Observations	592	592	592	592	592	592	592	592	592	592	592	592

6.5. Further Robustness Checks

Regression Results Using Changes in the Variables

In the previous section, this study examines the effect of ownership level, concentration and owners' identity. In this section, the study re-tests the above-mentioned relationship using the change in variables. Regression analyses using changes in the variables have at least two advantages over those using the level variables. First, these regressions are generally less likely to show spurious relationships between the variables than the regressions using the level variables. Second, these regressions allow us to examine the longer-term effect of ownership level, concentration and owners' identity on market liquidity. This study has assumed so far that the relation between the above-mentioned relationships is contemporaneous, at least on a yearly basis. However, the effect of ownership variables on market liquidity may be gradual. For example, a change in ownership in year t may have an impact on stock market liquidity in both year t and year t + 1. As a result, this study uses the "lagged values of ownership structure".

This study follows Poon et al. (2013), and employs the change in variable regression pooled OLS dummy industry and year in order to control for endogeneity and time invariant problems. The following model is used to examine the effect of the change in ownership level and concentration on the change in market liquidity:

$$\Delta\ LIQ_{it} = \alpha_0+\beta_1 \Delta\ IO_{it}+ \beta_2 \Delta\ INSO_{it}+ \beta_3 \Delta\ BKO_{it}+ \beta_4 \Delta\ LS_{it}+ \gamma_1 \Delta\ MV_{it}+ \gamma_2 \Delta\ P_{it}+ \gamma_3 \Delta\ VOL_{it}+ + \sum_{i=1}^{n} IND_i+\sum_{i=1}^{n} YEAR+ \varepsilon_i \ldots\ldots \quad (6.1)$$

Where *LIQ* is market liquidity, *IO* is the insider ownership, *INSO* is the institutional ownership, *BKO* is the blockholder, *LS* is large shareholder, *MV* is market value, *P* is shares price, *VOL* is volatility, *IND* and *YEAR* is the industry and year dummies respectively.

Moreover, this study investigates the effect of the change in owners' identity on the change in market liquidity:

$$\Delta\ LIQ_{it}=\alpha_0+\beta_1\Delta EO_{it}+\beta_2\Delta NEO_{it}+\beta_3 \Delta\ NOHFF_{it}+\beta_4 \Delta\ NOSHIC_{it}+\beta_5 \Delta\ NOSHOF_{it}+\beta_6 \Delta\ NOSHPF_{it}+\beta_7 \Delta\ NOSHGV_{it}+\beta_8 \Delta\ NOSHEM_{it}+\beta_9 \Delta\ NOSHCO_{it}+\beta_{10} \Delta\ NOSHFR_{it}+\gamma_1 \Delta\ MV_{it}+\gamma_2 \Delta\ P_{it}+\gamma_3 \Delta\ VOL_{it}+\sum_{i=1}^{n} IND+ \sum_{i=1}^{n} YEAR+ \varepsilon_i \ldots\ldots \quad (6.2)$$

Where *LIQ* is market liquidity, *EO* is the executive ownership, *NEO* is the non-executive ownership, *NOSHFF* is free float shares, *NOSHIC* investment company ownership, *NOSHPF* pension fund ownership, *NOSHGV* government ownership, *NOSHEM* employee ownership, *NOSHCO* cross-holding ownership, *NOSHFR* foreign ownership, *NOSHOF* other holding, *MV* is market value, *P* is shares price, *VOL* is volatility, and *IND* and *YEAR* is the industry and year dummies respectively.

Table 6.5 Panels A and B show that the effect of insider ownership on proportional bid-ask spread and price impact ratio is positively correlated pre, within and post financial crisis, whereas it is negatively related with real friction of market liquidity (i.e., number of trades , trade size, trading volume and turnover ratio). Moreover, it is noticeable from Table 6.5 that ownership concentration measured by blockholders and largest shareholders is positively correlated pre, within and post financial crisis, whereas it is negatively related with real friction of market liquidity (i.e., number of trades, trade size, trading volume and turnover ratio). In contrast, institutional ownership is negatively correlated pre, within and post financial crisis, whereas it is positively related with real friction of market liquidity (i.e., number of trades, trade size, trading volume and turnover ratio). These results are consistent with our findings in Chapter 4 and with Poon et al. (2013). However, the coefficient of the above-mentioned relationship is less significant in the crisis period in comparison with the pre- and post-crisis periods. In particular, the adjusted R^2 is lower in most of the model specifications, with the 2007-2009 financial crisis relative to the pre-crisis period.

With respect to the effect of owners' identity on market liquidity within the 2007-2009 financial crisis, Table 6.6 Panels A and B document a positive relationship between executive and non-executive director's ownership and proportional bid-ask spread and price impact ratio and a negative relationship with real friction of market liquidity (i.e., trading activity) pre, within and post recent financial crisis. However, Table 6.6 shows that there is a negative relationship between free float ownership and proportional bid-ask spread and price impact ratio and a positive impact on real friction of market liquidity (i.e., trading activity) pre-crisis, within crisis and post the recent financial crisis.

Table 6.5a Pooled OLS in the Change in Variables Regression Results regarding the Relationship between Ownership Level and Concentration and Total Market Liquidity

Table 6.5a presents results of the effect of ownership level and concentration on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$\Delta LIQ_{it} = \alpha_0 + \beta_1 \Delta IO_{it} + \beta_2 \Delta INSO_{it} + \beta_3 \Delta BKO_{it} + \beta_4 \Delta LS_{it} + \gamma_1 \Delta MV_{it} + \gamma_2 \Delta P_{it} + \gamma_3 \Delta VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad \text{(1a and 2a)}$$

$$\Delta LIQ_{it} = \alpha_0 + \beta_1 \Delta IO_{it} + \beta_2 \Delta INSO_{it} + \beta_3 \Delta BKO_{it} + \beta_4 \Delta LS_{it} + \gamma_1 \Delta MV_{it} + \gamma_2 \Delta P_{it} + \gamma_3 \Delta VOL_{it} + \gamma_4 \Delta TZ_{it} + \gamma_5 \Delta NT_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i \quad \text{(1b and 2b)}$$

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), proportional bid-ask spread (PBAS), Price impact ratio (Pimpact), trade size (TZ), number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) Dummies. See Table 3.2 for variables' definitions and measurements.

Panel A The Effect of Ownership Level and Concentration on Total Cost of Market Liquidity

	Pre-Crisis				Within Crisis				Post-Crisis			
	PBAS (1a)	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (1b)**	**Pimpact (2a)**	**Pimpact (2b)**
Insider ownership	0.13 (5.24)***	0.12 (5.00)***	0.40 (8.25)***	0.36 (7.81)***	0.10 (3.14)***	0.03 (1.11)	0.33 (4.98)***	0.16 (3.60)***	0.04 (1.16)	0.05 (1.46)	0.13 (2.81)***	0.12 (2.55)**
Large Shareholders	0.04 (1.35)	0.03 (1.22)	0.10 (2.04)**	0.06 (1.51)	0.04 (1.25)	0.03 (1.28)	0.04 (0.80)	0.03 (0.73)	0.05 (1.69)*	0.06 (1.76)*	0.10 (2.07)**	0.10 (2.10)**
Blockholders	0.01 (0.64)	0.01 (0.62)	0.03 (1.34)	0.03 (1.52)	0.07 (1.46)	0.05 (1.38)	0.17 (1.92)*	0.12 (2.11)**	0.01 (0.23)	0.01 (0.30)	0.06 (1.10)	0.04 (0.78)
Institutional Ownership	-0.24 (-4.48)***	-0.23 (-4.27)***	-0.54 (-6.70)***	-0.47 (-6.33)***	-0.02 (-0.39)	-0.03 (-0.67)	-0.04 (-0.39)	-0.05 (-0.79)	-0.08 (-1.42)	-0.07 (-1.31)	-0.02 (-0.24)	-0.01 (-0.08)
Market Value	-0.21 (-5.93)***	-0.15 (-3.76)***	-0.60 (-8.97)***	-0.40 (-5.89)***	-0.15 (-2.92)***	0.01 (0.30)	-0.31 (-3.54)***	0.04 (0.72)	-0.04 (-0.99)	0.01 (0.11)	-0.23 (-3.51)***	-0.13 (-2.07)**
Volatility	0.19 (4.73)***	0.18 (4.67)***	0.20 (3.06)***	0.17 (2.84)***	0.05 (1.01)	-0.01 (-0.35)	0.19 (2.14)**	0.04 (0.80)	0.23 (5.39)***	0.18 (4.28)***	0.28 (5.16)***	0.25 (4.67)***
Share price	-0.20 (-4.46)***	-0.18 (-4.23)***	-0.31 (-3.95)***	-0.26 (-3.74)***	-0.16 (-2.62)***	-0.04 (-0.94)	-0.14 (-1.33)	0.08 (1.39)	-0.15 (-2.49)**	-0.07 (1.13)	0.07 (1.08)	0.12 (1.69)*
Trade Size	-	0.03 (0.73)	-	-0.26 (-4.15)***	-	0.02 (0.32)	-	-0.34 (-4.27)***	-	0.27 (6.58)***	-	0.01 (0.03)
Number of Trades	-	-0.13 (-3.68)***	-	-0.43 (-7.62)***	-	-0.59 (-19.21)***	-	-1.24 (-22.36)***	-	-0.06 (-1.45)	-	-0.20 (-3.58)***
Industry Dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Time Dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-0.13 (-1.32)	-0.15 (-1.46)	-0.74 (-3.25)***	-0.70 (-3.27)***	-0.02 (-0.14)	-0.18 (-1.33)	-0.29 (-0.81)	-0.54 (-2.06)**	-1.72 (-6.81)***	-1.83 (-7.15)***	-3.21 (-8.78)***	-3.19 (-8.38)***
Adjusted R^2	**0.51**	**0.52**	**0.64**	**0.68**	**0.30**	**0.57**	**0.31**	**0.68**	**0.15**	**0.20**	**0.25**	**0.25**
Number of Observations	678	678	678	678	678	678	678	678	678	678	678	678

Table 6.5b Pooled OLS in the Change in Variables Regression Results regarding the Relationship between Ownership Level and Concentration and Real Friction of Market Liquidity

Table 6.5b presents results of the effect of ownership level and concentration on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$$\Delta LIQ_{it} = \alpha_0 + \beta_1 \Delta IO_{it} + \beta_2 \Delta INSO_{it} + \beta_3 \Delta BKO_{it} + \beta_4 \Delta LS_{it} + \gamma_1 \Delta MV_{it} + \gamma_2 \Delta P_{it} + \gamma_3 \Delta VOL_{it} + \sum_{i=1}^{n} IND + \sum_{i=1}^{n} YEAR + \varepsilon_i$$

A brief description of the ownership structure, market liquidity and control variables is given below. Insider ownership (IO), institutional ownership (INSO), blockholders (BKO), largest shareholder (LS), trade size (TZ), number of trades (NT), trading volume (VO) and turnover ratio (TR), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) Dummies. See Table 3.2 for variables' definitions and measurements.

Panel B The Effect of Ownership Level and Concentration on Real Friction of Market Liquidity

	Pre-Crisis				Within Crisis				Post-Crisis			
	NT	**TSIZE**	**TR**	**VO**	**NT**	**TSIZE**	**TR**	**VO**	**NT**	**TSIZE**	**TR**	**VO**
Insider Ownership	-0.08 (-2.99)***	-0.02 (-0.77)	-0.13 (-3.15)***	-0.17 (-5.06)***	-0.13 (-3.78)***	-0.02 (-1.31)	-0.06 (-1.83)*	-0.17 (-4.97)***	-0.08 (-2.42)**	-0.04 (-1.81)*	-0.02 (-0.70)	-0.13 (-4.33)***
Large Shareholder	-0.04 (-1.28)	-0.05 (-1.76)*	0.09 (2.39)**	-0.08 (-2.01)**	-0.01 (-0.31)	-0.01 (-0.05)	-0.02 (-0.63)	-0.05 (-1.38)	-0.01 (-0.16)	-0.01 (-0.33)	-0.01 (-0.41)	-0.05 (-2.28)**
Blockholders	-0.01 (-0.32)	-0.01 (-0.06)	-0.05 (-2.38)**	-0.03 (-2.29)**	-0.03 (-0.74)	-0.02 (-0.74)	-0.02 (-0.30)	-0.10 (-1.77)*	-0.08 (-2.16)**	-0.06 (-1.60)	-0.01 (-0.20)	-0.03 (-0.69)
Institutional Ownership	0.11 (1.94)*	0.07 (1.40)	0.28 (3.91)***	0.12 (1.33)	0.01 (0.18)	0.01 (0.29)	0.05 (0.75)	0.05 (0.86)	0.05 (0.97)	0.03 (0.66)	0.05 (1.40)	0.01 (0.09)
Market Value	0.42 (8.74)***	0.04 (1.39)	-0.20 (-3.60)***	0.63 (12.21)***	0.27 (5.21)***	0.01 (0.30)	-0.08 (-1.68)*	0.34 (5.84)***	0.44 (8.15)***	-0.08 (-2.36)**	-0.06 (-1.53)	0.30 (5.73)***
Volatility	-0.05 (-1.07)	-0.02 (-0.60)	0.26 (3.95)***	0.03 (0.55)	-0.11 (-1.99)**	-0.01 (-0.09)	0.10 (1.82)*	-0.02 (-0.30)	-0.11 (-2.62)***	0.15 (3.98)***	0.12 (3.48)***	-0.08 (-1.73)*
Share Price	0.14 (2.61)**	-0.04 (-1.11)	-0.25 (-4.52)***	0.08 (1.44)	0.20 (3.38)***	-0.08 (-2.32)**	-0.12 (-2.09)**	-0.02 (-0.26)	0.20 (4.15)***	-0.25 (-5.66)***	-0.07 (-1.57)	-0.05 (-0.93)
Industry Dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Time Dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-0.05 (-0.43)	0.25 (2.23)**	-0.88 (-4.63)***	0.34 (2.45)**	-0.25 (-1.27)	0.22 (2.01)**	-0.55 (-2.95)***	0.03 (0.14)	0.06 (0.30)	0.42 (2.18)**	-2.18 (-8.65)***	1.35 (5.86)***
Adjusted R^2	0.47	0.11	0.45	0.52	0.35	0.09	0.24	0.39	0.38	0.21	0.12	0.24
Number of Observations	678	678	678	678	678	678	678	678	678	678	678	678

Table 6.6a Pooled OLS in the Change in Variables Regression Results regarding the Relationship between Owners' Identity and Total Market Liquidity

Table 6.6a presents results of the effect of owners identity on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$\Delta LIQ_{it}=\alpha_0+\beta_1 \Delta EO_{it}+\beta_2 \Delta NEO_{it}+\beta_3 \Delta NOHFF_{it}+\beta_4 \Delta NOSHIC_{it}+\beta_5 \Delta NOSHOF_{it}+\beta_6 \Delta NOSHPF_{it}+\beta_7 \Delta NOSGV_{it}+\beta_8 \Delta NOSHEM_{it}+\beta_9 \Delta NOSHCO_{it}+\beta_{10} \Delta NOSHFR_{it}+\gamma_1 \Delta MV_{it}+\gamma_2 \Delta P_{it}+\gamma_3 \Delta VOL_{it}+\sum_{i=1}^{n} IND+ \sum_{i=1}^{n} YEAR+ \varepsilon i$ ……(1a and 2a)

$\Delta LIQ_{it}=\alpha_0+\beta_1 \Delta EO_{it}+\beta_2 \Delta NEO_{it}+\beta_3 \Delta NOHFF_{it}+\beta_4 \Delta NOSHIC_{it}+\beta_5 \Delta NOSHOF_{it}+\beta_6 \Delta NOSHPF_{it}+\beta_7 \Delta NOSGV_{it}+\beta_8 \Delta NOSHEM_{it}+\beta_9 \Delta NOSHCO_{it}+\beta_{10} \Delta NOSHFR_{it}+\gamma_1 \Delta MV_{it}+\gamma_2 \Delta P_{it}+\gamma_3 \Delta VOL_{it}+\gamma_4 \Delta TZ_{it}+\gamma_5 \Delta NT_{it}+\sum_{i=1}^{n} IND+\sum_{i=1}^{n} YEAR+\varepsilon_i$ ……..(1b and 2b)

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), proportional bid-ask spread (PBAS), price impact ratio (Pimpact), trade size (TZ), and number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) dummies. The t-statistics are reported in parentheses. See Table 3.2 for variables' definitions.

Panel A The Relationship between Owners' Identity and Total Liquidity Costs

	Pre-Crisis				Within Crisis				Post Crisis			
	PBAS (1a)	**PBAS (2a)**	**Pimpact (1b)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (2a)**	**Pimpact (1b)**	**Pimpact (2b)**	**PBAS (1a)**	**PBAS (2a)**	**Pimpact (1b)**	**Pimpact (2b)**
EO	0.09 (4.15)***	0.09 (3.88)***	0.25 (5.32)***	0.22 (5.01)***	0.06 (1.64)	0.01 (0.10)	0.23 (3.49)***	0.09 (2.21)**	0.01 (0.08)	0.01 (0.09)	0.07 (1.85)*	0.06 (1.54)
NEO	0.03 (1.61)	0.02 (1.30)	0.11 (2.79)***	0.07 (2.06)**	0.07 (2.21)**	0.02 (1.00)	0.14 (2.29)**	0.04 (1.20)	0.04 (1.63)	0.04 (1.76)*	0.01 (0.36)	0.01 (0.23)
NOSHCO	0.03 (2.30)**	0.03 (2.23)**	0.04 (1.77)*	0.04 (1.85)*	0.06 (1.40)	0.08 (2.13)**	0.07 (0.92)	0.11 (1.87)*	0.04 (0.65)	0.04 (0.72)	0.02 (0.51)	0.02 (0.58)
NOSHEM	0.01 (0.28)	0.01 (0.28)	0.01 (0.09)	0.03 (0.39)	0.01 (0.24)	0.01 (0.20)	0.07 (0.95)	0.07 (1.24)	0.03 (2.05)**	0.02 (1.76)*	0.03 (2.20)**	0.02 (1.83)*
NOSHGV	0.08 (2.12)**	0.09 (2.42)**	0.07 (1.00)	0.12 (1.63)	0.07 (1.50)	0.02 (0.41)	0.05 (0.84)	0.04 (0.70)	0.01 (0.16)	0.01 (0.22)	0.02 (0.69)	0.02 (0.52)
NOSHIC	0.08 (1.79)*	0.09 (1.86)*	0.18 (2.56)**	0.17 (2.39)**	0.01 (0.31)	0.03 (0.99)	0.03 (0.45)	0.02 (0.38)	0.01 (0.09)	0.01 (0.17)	0.01 (0.22)	0.01 (0.13)
NOSHPF	0.05 (2.35)**	0.04 (1.74)*	0.14 (1.67)*	0.09 (1.33)	0.03 (0.67)	0.01 (0.15)	0.01 (0.11)	0.03 (0.55)	0.04 (1.08)	0.04 (1.06)	0.01 (0.01)	0.01 (0.04)
NOSHFR	0.13 (3.01)***	0.12 (2.78)***	0.24 (3.17)***	0.19 (2.66)***	0.13 (2.02)**	0.11 (2.17)**	0.25 (2.05)**	0.18 (2.28)**	0.09 (1.50)	0.07 (1.29)	0.06 (0.77)	0.04 (0.53)
NOSHOF	0.24 (2.59)***	0.25 (2.54)**	0.16 (1.12)	0.16 (1.22)	0.19 (1.16)	0.04 (0.26)	0.49 (1.84)*	0.23 (1.02)	0.24 (1.85)*	0.35 (2.53)**	0.16 (0.89)	0.12 (0.69)
NOSHFF	-0.20 (-2.73)***	-0.19 (-3.55)***	-0.51 (-5.86)***	-0.45 (-5.58)***	-0.02 (-0.27)	-0.01 (-0.13)	-0.04 (-0.44)	-0.01 (-0.01)	-0.05 (-1.04)	-0.05 (-0.94)	-0.02 (-0.30)	-0.03 (-0.44)
Market value	-0.17 (-4.00)***	-0.12 (-3.11)***	-0.51 (-7.00)***	-0.36 (-5.04)***	-0.12 (-2.30)**	0.02 (0.51)	-0.26 (-2.91)***	0.05 (0.99)	-0.05 (-1.01)	0.01 (0.05)	-0.25 (-3.80)***	-0.15 (-2.32)**
Volatility	0.18 (4.86)***	0.18 (4.83)***	0.19 (2.86)***	0.17 (2.75)***	0.04 (0.81)	-0.02 (-0.40)	0.18 (2.11)**	0.06 (0.96)	0.24 (5.73)***	0.19 (4.50)***	0.30 (5.71)***	0.27 (5.17)***
Share Price	-0.19 (-4.16)***	-0.17 (-3.89)***	-0.27 (-3.40)***	-0.23 (-3.31)***	-0.15 (-2.57)**	-0.04 (-0.89)	-0.12 (-1.17)	0.09 (1.55)	-0.16 (-2.62)***	-0.08 (-1.26)	0.08 (1.16)	0.13 (1.78)*
Trade Size	-	0.05 (1.15)	-	-0.23 (-3.44)***	-	0.02 (0.37)	-	-0.34 (-4.20)***	-	0.27 (6.44)***	-	-0.01 (-0.04)
Number of trades	-	-0.13 (-3.36)***	-	-0.41 (-7.19)***	-	-0.59 (-19.44)***	-	-1.25 (-22.16)***	-	-0.06 (-1.39)	-	-0.21 (-3.81)***
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.12 (-1.30)	-0.15 (0.55)	-0.59 (-2.70)***	-0.63 (-2.91)***	-0.01 (-0.07)	-0.19 (-1.44)	-0.15 (-0.45)	-0.45 (-1.85)***	-1.78 (-6.72)***	-1.90 (-6.96)***	-3.40 (-8.53)***	-3.37 (-8.12)***
Adjusted R^2	**0.54**	**0.55**	**0.64**	**0.68**	**0.31**	**0.58**	**0.32**	**0.69**	**0.15**	**0.21**	**0.22**	**0.24**
Number of Observations	678	678	678	678	678	678	678	678	678	678	678	678

Table 6.6b Pooled OLS on the Change in Variables Regression Results regarding the Relationship between Owners' Identity and Real Friction of Market Liquidity

Table 6.6b presents results of the effect of owners identity on market liquidity in the pre-crisis (2004-2006), crisis (2007-2009) and post crisis (2010-2012) periods. The table contains coefficient values and t-statistics obtained from the estimation of the following model. Figures reported in parentheses represent t-statistics which are based on robust standard errors, where ***,**,* mean significance at the 1%, 5% and 10% levels respectively.

$\Delta LIQ_{it}=\alpha_0+\beta_1 \Delta EO_{it}+\beta_2 \Delta NEO_{it}+\beta_3 \Delta NOHFF_{it}+\beta_4 \Delta NOSHIC_{it}+\beta_5 \Delta NOSHOF_{it}+\beta_6 \Delta NOSHPF_{it}+\beta_7 \Delta NOSGV_{it}+\beta_8 \Delta NOSHEM_{it}+\beta_9 \Delta NOSHCO_{it}+\beta_{10} \Delta NOSHFR_{it}+\gamma_1 \Delta MV_{it}+\gamma_2 \Delta P_{it}+\gamma_3 \Delta VOL_{it}+\sum_{i=1}^{n} IND+ \sum_{i=1}^{n} YEAR+ \varepsilon i$

A brief description of the ownership structure, market liquidity and control variables is given below. Executive ownership (EO), non-executive ownership (NEO), free float holding (NOSHFF), foreign holding (NOSHFR), investment company holding (NOSHIC), pension fund holding (NOSHPF), government holding (NOSHGV), employee holding (NOSHEM), cross-holding (NOSHCO), other holding (NOSHOF), turnover ratio (TR), trade size (TZ), trading volume (VO), and number of trades (NT), firm size (MV), share price (P), return volatility (VOL), Industry (IND) and Year (YEAR) dummies. The t-statistics are reported in parentheses. See Table 3.2 for variables' definitions.

Panel B The Relationship between Owners' Identity and Real Friction of Market Liquidity												
	Pre- Crisis				**Within Crisis**				**Post- Crisis**			
	NT	**TSIZE**	**VO**	**TR**	**NT**	**TSIZE**	**VO**	**TR**	**NT**	**TSIZE**	**VO**	**TR**
EO	-0.06 (-2.18)**	-0.01 (-0.27)	-0.11 (-3.07)***	-0.09 (-2.67)***	-0.09 (-2.57)**	-0.03 (-1.93)*	-0.06 (-1.72)*	-0.14 (-3.70)***	-0.06 (-1.86)*	-0.01 (-0.51)	-0.01 (-0.60)	-0.07 (-2.39)**
NEO	-0.07 (-2.82)***	-0.03 (-1.35)	-0.02 (-0.87)	-0.11 (-3.47)***	-0.08 (-2.31)**	-0.02 (-1.91)*	-0.01 (-0.09)	-0.07 (-1.91)*	-0.02 (-0.71)	-0.01 (-0.12)	-0.04 (-2.13)**	-0.06 (-2.21)**
NOSHCO	-0.01 (-0.68)	-0.01 (-0.19)	-0.01 (-0.35)	-0.03 (-2.26)**	-0.03 (-0.77)	-0.01 (-0.39)	-0.02 (-0.52)	-0.01 (-0.22)	-0.01 (-0.33)	-0.01 (-0.21)	-0.01 (-0.43)	-0.02 (-0.88)
NOSHEM	-0.03 (-0.76)	-0.08 (-2.40)**	-0.01 (-0.05)	-0.11 (-2.06)**	-0.01 (-0.11)	-0.03 (-1.05)	-0.01 (-0.01)	-0.03 (-0.67)	-0.03 (-2.10)**	-0.01 (-0.52)	-0.01 (-1.73)*	-0.01 (-0.93)
NOSHGV	-0.10 (-2.28)**	-0.02 (-0.46)	-0.17 (-3.90)***	-0.04 (-0.84)	-0.08 (-1.90)*	-0.03 (-0.94)	-0.08 (-2.12)**	-0.13 (-2.60)**	-0.02 (-1.02)	-0.01 (-0.04)	-0.07 (-1.51)	-0.04 (-1.53)
NOSHIC	-0.01 (-0.12)	-0.08 (-1.72)*	0.17 (2.82)***	-0.06 (-1.01)	-0.02 (-0.44)	-0.03 (-1.15)	-0.03 (-0.71)	-0.05 (-1.18)	-0.03 (-0.54)	-0.04 (-1.00)	-0.04 (-1.35)	-0.05 (-1.35)
NOSHPF	-0.10 (-2.63)***	-0.03 (-1.09)	-0.01 (-0.24)	-0.09 (-1.75)*	-0.04 (-0.86)	-0.04 (-1.16)	-0.03 (-0.62)	-0.05 (-0.86)	-0.01 (-0.13)	-0.01 (-0.20)	-0.01 (-0.21)	-0.01 (-0.14)
NOSHFR	-0.07 (-1.32)	-0.05 (-1.22)	-0.05 (-0.83)	-0.19 (-2.94)***	-0.04 (-0.64)	-0.06 (-1.86)*	-0.05 (-0.69)	-0.12 (-1.65)*	0.09 (1.62)	-0.03 (-0.77)	-0.06 (-1.46)	-0.05 (-0.91)
NOSHOF	-0.01 (-0.08)	-0.01 (-0.02)	-0.07 (-1.32)	-0.01 (-0.06)	-0.25 (-1.01)	-0.15 (-0.99)	-0.26 (-1.45)	-0.18 (-1.08)	-0.18 (-1.89)*	-0.43 (-1.77)*	-0.13 (-0.78)	-0.15 (-1.17)
NOSHFF	0.09 (1.66)*	0.06 (1.17)	0.09 (1.66)*	0.08 (0.87)	0.03 (0.58)	0.01 (0.21)	0.05 (0.69)	0.01 (0.18)	0.04 (0.79)	0.02 (0.50)	0.04 (1.03)	-0.01 (-0.14)
Market value	0.36 (7.35)***	0.01 (0.43)	0.36 (7.35)***	0.53 (10.25)***	0.25 (4.68)***	0.01 (0.51)	-0.08 (-1.69)*	0.29 (5.12)***	0.45 (8.10)***	-0.08 (-2.45)**	-0.07 (-1.60)	0.30 (5.55)***
Volatility	-0.04 (-0.82)	-0.01 (-0.31)	-0.04 (-0.82)	0.05 (1.01)	-0.10 (-1.85)*	-0.01 -(0.27)	0.12 (2.10)**	-0.01 (-0.07)	-0.13 (-2.86)***	0.16 (4.34)***	0.12 (3.32)***	-0.09 (-1.93)*
Share Price	0.12 (2.26)**	-0.07 (-1.67)*	0.12 (2.26)**	0.03 (0.63)	0.19 (3.30)***	-0.07 (-2.11)**	-0.12 (-2.16)**	-0.03 (-0.45)	0.21 (4.21)***	-0.25 (-5.44)***	-0.07 (-1.54)	-0.05 (-0.99)
Industry	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-0.21 (-1.75)*	0.24 (2.23)**	-0.21 (-1.75)*	0.21 (1.44)	-0.29 (-1.46)	0.20 (1.80)*	-0.52 (-2.63)***	-0.02 (-0.13)	0.15 (0.64)	0.45 (2.26)**	-2.08 (-8.04)***	1.40 (5.69)***
Adjusted R^2	**0.50**	**0.12**	**0.50**	**0.55**	**0.37**	**0.11**	**0.25**	**0.40**	**0.38**	**0.21**	**0.14**	**0.23**
Number of Observations	678	678	678	678	678	678	678	678	678	678	678	678

Nevertheless, Table 6.6 shows that there is a positive relationship between the controlled shareholders (government, pension fund, employee, foreign, cross-holding, investment companies, and other holding) and proportional bid-ask spread and price impact ratio and a negative impact on real friction of market liquidity (i.e., trading activity) pre, within and post the recent financial crisis. These results are consistent with our findings in Chapter 5 and with Poon et al. (2013). However, the coefficient of the above-mentioned relationship is less significant in the crisis period in comparison with the pre- and post-crisis periods. Consequently, this study uses the annual changes in variables as a further test; we notice that our results remain unchanged with that reported in the main analysis section.

6.6. Summary

This chapter has examined how the ownership structure in terms of level and concentration and the owners' identity are related to market liquidity during the recent financial crisis. In this chapter, the study period is divided into three sub-periods. The pre-crisis period includes 2004-2006, the crisis period is 2007-2009 and the post-crisis period is 2010-2012. The definition of crisis period is consistent with recent research papers (Akbar et al., 2013; Florackis et al., 2014; Kontonikas et al., 2013). However, this study follows Poon et al. (2013) and employs the Pooled OLS dummy year and industry in the main analysis.

The findings in this chapter indicate that the insider ownership is significantly negatively related with market liquidity in the pre-crisis, crisis and post-crisis periods. These findings are similar to those obtained in Chapter 4 using the full period. Further, the blockholders and largest shareholders lower market liquidity in the three sub-periods, i.e., pre, during and post crisis. This negative effect is found under all market liquidity measures. The results on institutional ownership are consistent with our findings in Chapter 4, where a positive relationship is shown between institutional ownership and market liquidity. However, our results reveal that the above-mentioned relationship is less significant and strong during the recent financial crisis. In particular, the adjusted R^2 is lower in most of the model specifications with the 2007-2009 financial crisis relative to the pre- crisis period.

Moreover, with respect to the effect of owners' identity on market liquidity during the recent financial crisis, this study documents a positive relationship between executive and non-executive directors' ownership and proportional bid-ask spread and price impact ratio and a negative relationship with real friction of market liquidity (i.e., trading activity) pre, within and post the recent financial crisis. However, this study shows that there is a negative relationship between

free float ownership and proportional bid-ask spread and price impact ratio and a positive impact on real friction of market liquidity (i.e., trading activity) pre, within and post the recent financial crisis. These findings are similar to those obtained in Chapter 5 using the full period. However, the coefficient of the above-mentioned relationship is less significant in the crisis period in comparison with the pre- and post-crisis periods. In particular, the adjusted R^2 is lower in most of the model specifications with the 2007-2009 financial crisis relative to the pre- crisis period.

Nevertheless, this study shows that there is a positive relationship between the controlled shareholders (government, pension fund, employee, foreign, cross-holding, investment companies, and other holding) and proportional bid-ask spread and price impact ratio and a negative impact on real friction of market liquidity (i.e., trading activity) pre, within and post the recent financial crisis. These results are consistent with our findings in Chapter 5 and with Poon et al. (2013). However, the coefficient of the above-mentioned relationship is less significant in the crisis period in comparison with the pre- and post-crisis periods. Consequently, this study uses the annual changes in variables as a further test; we notice that our results remain unchanged with that reported in the main analysis section. As a result, these findings are robust in applying different sensitivity specification tests such as the change in variables regression.

One possible explanation for the consistency of the results between crisis and full period analysis is that the method of estimation that was used, which is pooled OLS year and industry dummy, helps us to control for endogeneity and spurious inferences. Following Poon et al. (2013), this study includes industry fixed effects to control for time-invariant omitted industry-level factors that affect market liquidity. Moreover, this study also includes year effects to control for cross-sectional dependence; that is, market-wide factors that affect market liquidity. Furthermore, this study clusters the errors at the firm level in order to control for time-series dependence. This study concludes that applying these techniques controls for simultaneity and unobserved heterogeneity as well. Moreover, our results are in line with previous studies (Poon et al., 2013). The next chapter presents the overall conclusions drawn from the outcome of this research specify the limitations, and pinpoint avenues for future research.

Chapter 7

Conclusions and Implications

7.1 Introduction

This study investigates the effect of ownership level, concentration and owners' identity on market liquidity in the UK. A short summary of the evidence from the results of the three empirical parts of the thesis and its interpretations is presented and discussed in this chapter. Furthermore, together with providing a summary of the research findings, this chapter summarises and addresses other major issues such as a restatement of the research problem and the research question, a description of the research methods used to answer the research question, the implications of this study, the research limitations and avenues for further research.

7.2 Restatement of the Research Problem and the Research Questions

Ownership structure plays an increasingly important role in explaining market liquidity. Several studies have investigated the effect of ownership structure on market liquidity in the US capital markets (Brockman et al., 2009; Chiang & Venkatesh 1988; Heflin & Shaw 2000; Jacoby & Zheng 2010). In contrast, few studies to date have examined the ownership-liquidity relationship in the UK. This study therefore argues that as compared to other countries, UK not only has different attributes but there are also some major differences in its market structure and disclosure requirements (Fidrmuc et al., 2006). The aim of this study was to examine the effect of ownership level concentration and owners' identity on market liquidity in the UK capital market. There are two primary hypotheses through which ownership structure can affect market liquidity: trading and the adverse selection hypothesis. Trading hypothesis posits that the number of shareholders participating in trade affects market liquidity. In contrast, adverse selection hypothesis posits that stockholders who reduce agency costs by providing internal monitoring also reduce market liquidity by creating adverse selection problems in the capital market (Bhide 1993; Bolton & Von Tadden 1998; Brockman et al., 2009; Coffee 1991; Ginglinger & Hamon 2007; Holmstrom & Tirole 1993; Jacoby & Zheng 2010; Rubin 2007; Zhou 2011 for more details). Previous empirical studies that investigate ownership-liquidity relationship often deal with the trading hypothesis. As a result, the purpose of this study is to

examine the ownership structure-market liquidity relationship from both adverse selection and trading perspectives.

There is little consensus on the importance of adverse selection hypothesis in general, and even less consensus on the market liquidity-ownership structure relationship. This study follows Stoll (2000) and Brockman et al.'s (2009) suggestion by disentangling real and informational effects by first examining the impact of ownership level, concentration and owners' identity on the real costs of trading. After measuring the real friction effects, this study examines the impact of ownership level, concentration and owners' identity on market liquidity (e.g., bid-ask spread, and price impact ratio) while controlling for the known real friction effects. Moreover, this study uses proxies of ownership structure such as the insider-institutional holdings and ownership concentration; largest shareholder and blockholder. Therefore, this study reinvestigates the relationship between ownership level, concentration and owners' identity and market liquidity in the UK capital market. In addition, the following important questions have yet to be answered in the ownership-liquidity relationship: (i) Blockholder ownership is just one dimension of ownership concentration, how does the largest shareholder, another dimension of ownership concentration, affect market liquidity. (ii) How do institutional and insider ownership affect market liquidity? (iii) How do insider, institutional and ownership concentration affect different proxies of marker liquidity? Moreover, this study investigates the effect of owners' identity on market liquidity. Lastly, this study tests the above- mentioned relationship during the recent financial crisis.

7.3 Summary of the Research Methodology

A challenging issue in the market liquidity literature is identifying the fundamental nature of the components and central to this problem is measuring the different market liquidity proxies. However, low frequency measures of market liquidity, do not include complex measures and are usually provided directly by Datastream. In contrast, the adverse selection component of market liquidity has a different nature and needs to be paid more attention to, since it is more complex than other components of market liquidity. The measurements of ownership and its identity variables were consistent with previous studies that investigated issues related to ownership structure-market liquidity relationship. However, a slight difference exists in the measurement of the proportion of insider ownership and blockholder according to the UK Corporate Governance Code's criteria.

Two models were constructed and a set of hypotheses were stated. The study data for the all the variables used in this research over the period between 2003 and 2012 was collected from Worldscope/ Datastream and BoardEx. Thus, this study provides the most recent investigation on market liquidity in relationship to the impact of the UK Corporate Governance Code (2003) and Stewardship Code (2010). The sample data is based on firms listed in the FTSE All-Share. However, financial firms were excluded from the sample due to standard reasons.. Two main sources were used to gather the data; namely annual reports and Datastream. Information about insider ownership and blockholder variables was manually collected from BoardEx and annual reports respectively. Financial and market data were gathered from Datastream and some of them were calculated using Excel. The research hypotheses were derived and tested with pooled OLS year and industry dummies techniques, which helped the author in identifying the relationship between ownership level, concentration, owners' identity and market liquidity.

Selecting the appropriate estimation method is a very critical stage in conducting any research as it ensures that the study's objectives will be validly achieved. In order to determine this validity in performing the analysis of the study, a careful examination of possible problems related to the nature of the data was undertaken. In general, most of the assumptions or the conditions of parametric methods were met, and thus a using non-parametric technique was not suggested statistically. Since the problems of heteroscedasticity and autocorrelation are not suspected in the first model, a pooled OLS regression was preferred over GLS regression, as it is assumed to control or correct for such problems, together with using the natural logarithm of the study's variables to correct for non-normality. In the second empirical model, several checks were made to diagnose the problematic features of the data, and to determine the appropriate statistical technique and estimation method used to test the hypotheses. According to the findings of these tests, it was decided to use cluster robust estimation in the primary analysis as it is statistically suggested for controlling the problems of autocorrelation and heteroscedasticity.

7.4 Summary of the Research Findings and Theoretical Implications

The results of this study provide evidence that ownership level, concentration and owners' identity do matter with respect to market liquidity in the UK. The empirical findings show that there is a relationship between ownership level, concentration and owners' identity and market liquidity. In the first empirical chapter, this study relies on the adverse selection and trading

hypotheses whereas, in the second empirical chapter, depends on the above- mentioned hypotheses and information hierarchy hypothesis while investigating the role of owners' identity on market liquidity. This study constructs a sample from all the publicly listed firms in the FTSE All-Share Index on the London Stock Exchange. The final number of non-financial firms reached 260 listed companies. The study covers a 10-year time period and provide up-to-date evidence as well as includes the effect of the recent financial crisis.

This study investigates the empirical models using a pooled OLS year and industry dummy. The main challenge in any ownership structure studies is how to control for the endogeneity problem. The literature documents that ownership structure variables are endogenously determined (Brockman et al., 2009; Heflin & Shaw 2000; Poon et al., 2013; Rubin 2007). Therefore, using the traditional estimation methods will not provide consistent results because they fail to control for all the sources of endogeneity. The pooled OLS year and industry dummy control for two types of endogeneity, namely unobserved heterogeneity and simultaneity. Moreover, this study uses the "lagged values" for all ownership structure variables.

7.4.1 The Effect of Ownership Level and Concentration on Market Liquidity

This section displays the main results from Chapter 4. This chapter investigates the effect of ownership level and concentration on market liquidity in the UK. The study records a significantly negative relationship between insider ownership and market liquidity. Prior studies that apply OLS report similar results (Chiang & Venkatesh 1988; Comerton-Forde & Rydge 2006; Heflin & Shaw 2000; Rubin 2007). The results state that there is a negative relationship between market liquidity and insider ownership in the UK. This negative relationship is in line with the adverse selection theory (Chiang & Venkatesh 1988; Glosten & Milgrom 1985; Copeland & Galai 1983).

In particular, there is a positive relationship between insider ownership and proportional bid-ask spread and price impact ratio. Interestingly, this study finds that insider ownership still has a positive and significant impact on both the proportional bid-ask spread and price impact ratio, once this study controls for trading activity (i.e., number of trades and trade size). In particular, after this study controls for the impact of trading activity (i.e., number of trades and trade size), the adverse effect of insider ownership on the bid-ask spread and price impact ratio become

lower, but there is still a positive and significant relationship between insider ownership and bid-ask spread and price impact ratio.

Therefore, this study's results provide strong support for the adverse selection hypothesis that insider ownership increases the proportional bid-ask spread and price impact ratio even after controlling trading activity measures. Our results are in line with previous studies (see Chiang & Venkatesh 1988; Dennis & Weston 2001; Kini & Mian 1995; Rubin 2007; Sarin et al., 2000; Zhou 2011, for more details). With respect to the trading activity measures, this study uses number of trades, trade size, turnover ratio and trading volume; the study's findings are consistent with the trading activity hypothesis, which suggests that insider ownership reduces the firm's trading activity and that insider owners trade less then institutional investors (Comerton-Forde & Rydge 2006; Rubin 2007). This leads us to accept $\boldsymbol{H_1}$, which states that there is a negative relationship between insider ownership and market liquidity.

With respect to institutional ownership, Chapter 4 documents that there is a positive relationship between institutional ownership and market liquidity. Specifically, our results reveal that there is a negative relationship between institutional ownership and both proportional bid-ask spread and price impact ratio. Moreover, after this study controls for the trading activity measures (i.e., number of trades and trade size), the results reveal that institutional ownership has a negative insignificant impact on proportional bid-ask spread but a negative and significant impact on price impact ratio. Our results reveal that institutional investors are not considered to be informed investors, which is in line with Fehle (2004) and Sarin et al. (2000). Thus, consistent with some of the previous empirical evidence, it is found that the institutional shareholders in UK firms are passive and ineffective when it comes to monitoring and they turn off their portfolio more often (Coffee 1991; Cosh & Hughes 1997; Franks et al., 2001; Goergen & Renneboog 2001; Maug 1998; Pound 1988). This leads us to accept $\boldsymbol{H_2}$, which states that there is a positive relationship between institutional ownership and market liquidity.

With respect to ownership concentration, Chapter 4 reports that ownership concentration (i.e., large shareholders and blockholders) has a negative effect on market liquidity. In contrast with other previous results that use blockholders as sole measure of ownership concentration (Brockman et al., 2009; Heflin & Shaw 2000; Kini & Mian 1995), this study uses two dimensions of ownership concentration: blockholders and largest shareholders (top five large shareholders). Following the recent literature in the UK, this study uses blockholders who hold

3% and more of the share capital according to the disclosure requirements of the London Stock Exchange. Furthermore, this study uses another measure of ownership concentration, which is the top five largest shareholders, in line with previous studies (Jacoby & Zheng 2010; Rubin 2007).

The finding of this study show that there is a positive and significant the relationship between the blockholders and proportional bid-ask spread and price impact ratio. In terms of information friction effect, this study finds that blockholders still have a positive and significant impact on both the proportional bid-ask spread and price impact ratio, once this study controls for trading activity by employing a liquidity measure that is highly correlated with trading. Specifically, after this study controls for the impact of trading activity (i.e., number of trades and trade size), the adverse effect of blockholders on bid-ask spread and price impact ratio become lower, but there is still a positive and significant relationship between blockholders and bid-ask spread and price impact ratio. Accordingly, the results support the adverse selection hypothesis, which suggests that blockholders have access to the firm's private information (Brockman et al., 2009; Heflin & Shaw 2000). This finding leads us to accept $\boldsymbol{H_3}$, for FTSE all share index; $\boldsymbol{H_3}$ states that there is a negative relationship between blockholders and market liquidity.

Moreover, this study uses the largest shareholders as another proxy of ownership concentration; in fact, this study reveals that large shareholders are a decreasing function of the proportional bid-ask spread and price impact ratio. This study found that large shareholders' ownership are significantly positively correlated with proportional bid-ask spread and insignificantly positively correlated with the price impact ratio. In terms of information friction effect, this study finds that large shareholders still have a positive and significant impact on both the proportional bid-ask spread and price impact ratio, once this study controls for trading activity by employing a liquidity measure that is highly correlated with trading. In particular, after this study controls for the impact of trading activity (i.e., number of trades and trade size), the adverse effect of LS on the spread and price impact ratio become lower, but there is still a positive and significant relationship between LS, spread, and price impact ratio. This finding leads us to accept $\boldsymbol{H_4}$, for the FTSE All-Share Index; $\boldsymbol{H_4}$ states that there is a negative relationship between large shareholders and market liquidity. This negative effect has also been reported by prior US studies (Brockman et al., 2009; Heflin & Shaw 2000; Jacoby & Zheng 2010).

7.4.2 The Effect of Owners' Identity on Market Liquidity

Chapter 5 empirically examines the effect of owners' identity in terms of insider and outsider identity on market liquidity in the UK. The main findings in Chapter 5 suggest the proportion of shares owned by the executive board of directors affects the level of market liquidity. This is consistent with $\boldsymbol{H_{1a}}$, which predicts that executive director's ownership is negatively related to the level of market liquidity. In contrast, the analysis of total costs and real friction of market liquidity produces interesting findings. Executive director's ownership is found to significantly increase the proportional bid-ask spread and price impact ratio. More importantly, this study finds that executive directors with greater ownership in their firms have private information that affects the market liquidity inversely, after this study controls for the well-known trading activity measures such as number of trades and trade size, which implies that executive director's ownership influences the information friction of market liquidity positively. As a result, the results provide strong support for the adverse selection hypothesis that executive director's ownership increases the bid-ask spread and price impact ratio, which inversely affects the market liquidity (Heflin & Shaw 2000). On the other hand, one can interpret this result under the trading hypothesis, which argues that executive directors trade less in contrast with outside investors (i.e., institutional). That is, an increase in executive director's ownership leads to a decrease in his/her motivation, which enhances the firm's value, which leads to decrease in market liquidity. Our findings are in line with Coffee (1991), Comerton-Forde & Rydge (2006), Heflin & Shaw (2000) and Rubin (2007).

The results for non-executive director's ownership provide strong evidence for $\boldsymbol{H_{1b}}$, which states that the non-executive director's ownership has a negative impact on market liquidity. This study finds that non-executive director's ownership is positively and significantly related to proportional bid-ask spread and price impact ratio. Furthermore, the findings show that the relationship between the non-executive director's ownership and real friction of market liquidity (i.e., trading activity measures) is negative and significant at 1% level. Accordingly, the results support the adverse selection hypothesis, which suggests that non-executive directors play a significant role in motivating the chairman of the board of directors to monitor management and eventually reduce agency costs (Shivdasani 1993; Vafeas 2003b). Moreover, with respect to real friction of market liquidity, non-executive directors with greater ownership reduce the trading

activity that reduced market liquidity. Therefore, consistent with the trading hypothesis, non-executive director's ownership is assumed to mitigate the agency problem through aligning the supervisory board's interests with those of shareholders and control the management; however, this leads to lower market liquidity.

With respect to the outsider ownership identities, consistent with hypothesis ***H_2***, which states that there is a negative relationship between pension fund ownership and market liquidity, this study finds that the pension fund ownership is positively and significantly associated with proportional bid-ask spread and price impact ratio. Moreover, this study finds evidence that pension fund ownership decreases the real friction of market liquidity through decreasing trading activity measures (i.e. number of trades, trade size, turnover ratio and trading volume). Our results are in line with existing literature that has documented that pension fund has a strong incentive to engage in investor activism (Cremers & Nair 2005; Dittmar & Mahrt-Smith 2007; Officer 2007). These studies suggest that public pension fund activism destroys firm value because of the agency problems between fund managers and members, which leads to lower market liquidity.

According to the adverse selection and trading hypothesis, this study hypothesised that foreign ownership decreases market liquidity. This study finds that foreign ownership increases proportional bid-ask spread and price impact ratio, while it has a negative impact on real friction of market liquidity such as number of trades, trade size, turnover ratio and trading volume, which leads us to accept ***H_3***, that there is a negative relationship between foreign ownership and market liquidity. Thus, these findings are consistent with the adverse selection hypothesis that foreign institutions are less likely to have a positive impact on market liquidity. This is due to the fact that foreign institutional investors are perceived to be better traders given that they are better informed (Grinblatt & Keloharju 2000; Seasholes 2004).

With respect to investment banks' ownership, this study's results that there is a negative and significant relationship between investment banks' ownership and market liquidity; this leads us to accept ***H_4***, which states that there is a negative relationship between investment banks' ownership and market liquidity. In particular, this study finds that there is a positive relationship between investment company's ownership and proportional bid-ask spread and price impact ratio and a negative relationship between investment company's ownership and real friction of market liquidity (i.e., trading volume, number of trades, trade size, and turnover ratio). Our

results are in line with previous studies (Barabanov & McNamara 2002; Fehle 2004; Syamala et al., 2014). Regarding government ownership, our results find that there is a positive impact between government ownership and proportional bid-ask spread and price impact ratio and a negative impact of real friction of market liquidity (i.e., trading activity measures); this leads us to accept $\boldsymbol{H_5}$, which states that there is a negative relationship between government ownership and market liquidity. Our findings are in line with Brockman & Chung (2003).

Finally, with respect to the free float shares, to the author's knowledge few studies in the ownership-liquidity relationship take into consideration the free float as one of the determinants of market liquidity. Our results in Chapter 5 reveal that there is a positive relationship between market liquidity and free float shares. Specifically, there is a negative relationship between proportional bid-ask spread and price impact ratio and positive impact of real friction of market liquidity. This finding leads us to accept $\boldsymbol{H_6}$, that there is a positive relationship between free float share and market liquidity. Our findings are in line with Amihud et al. (1999), Bhide (1993), Holmstrom & Tirole (1993) and Zheng & Li (2008). Furthermore, the findings of this study reveal a marginally negative relationship between cross-holdings, other holdings and employee ownership and market liquidity, which is inconsistent with the result reported in (Park 2009). With repect to these differences, it may be argued, that the sample size, time period and market environment of this study are different from that of Park (2009).

7.4.3 The Effect of Ownership Level, Concentration and Owners' Identity on Market Liquidity during the Recent Financial Crisis

In Chapter 6, the study examined the effect of Ownership Level, Concentration and Owners' Identity on Market Liquidity during the recent financial crisis. Following Akbar et al. (2013), Kontonikas et al. (2013) and Florackis et al. (2014), the study defines the crisis period as 2007-2009. According to this definition, the crisis period includes three periods: pre-crisis (2004-2006), crisis period (2007-2009) and post-crisis period (2010-2012). Following Poon et al. (2013), this study runs the pooled OLS industry and year dummies in the main analysis. Poon et al. (2013) argue that this method controls for the endogeneity problem. Therefore, and to control for the effect of endogeneity, the empirical strategy includes several steps to minimise the effect of such an issue in the estimation. First, following Brockman et al. (2009), this study controls for simultaneity by introducing the "lagged values" of the ownership variables. Second, to control for unobservable heterogeneity, this study follows Poon et al. (2013) and includes year and industry fixed effects by introducing dummies for each year and each industry within the non-

financial sectors. Finally, this study follows Poon et al. (2013) and estimates robust standard errors to control for serial correlation and heteroscedasticity using the option "Robust" in STATA 11.

The findings for both total liquidity costs and real friction of market liquidity suggest that the executive and non-executive director's ownership is significant in the pre-crisis, crisis and post-crisis periods. The findings also reveal that in the pre-crisis and crisis periods the executive and non-executive directors' ownership have a marginally negative impact on market liquidity. Regarding the outsider ownership identities, the results reveals an insignificantly positive relationship between pension fund ownership (NOSHPF) and price impact ratio in the crisis and post-crisis periods and insignificantly negative relationship between NOSHPF and trade size (TZ) in the pre-crisis period. This means that in the pre-crisis and crisis periods pension fund ownership has a marginally negative impact on market liquidity whereas foreign ownership (NOSHFR) has an insignificantly positive impact on the proportional bid-ask spread (PBAS) in the pre-crisis period. Moreover, an insignificantly negative relationship is observed between NOSHFR and trade size (TZ) and number of trade (NT) in the pre-crisis period. This means that in the pre-crisis foreign ownership has a marginally negative impact on market liquidity.

With respect to investment banks ownership (NOSHIC the findings reveals an insignificantly positive relationship between NOSHIC and the proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) in the crisis and post-crisis periods. Moreover, an insignificantly negative relationship is also found between NOSHIC and trade size (TZ) and trading volume (VO) in the pre-crisis period. This means that investment banks' ownership has a marginally negative impact on market liquidity. With respect to government ownership (NOSHGV), the findings further reveals an insignificantly positive relationship between NOSHGV and the proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) in the crisis and pre-crisis periods. Moreover, the findings also show an insignificantly negative relationship between NOSHGV and trade size (TZ) and trading volume (VO) in the pre-crisis period. This means that government ownership has a marginally negative impact on market liquidity in the pre-crisis period.

With respect to cross-holdings (NOSHCO), the findings suggest an insignificantly positive relationship between NOSHCO and the proportional bid-ask spread (PBAS) and price impact ratio (Pimpact) in the pre-crisis period. Moreover, the results also show an insignificantly negative relationship between NOSHCO and trade size (TZ), trading volume (VO), number of

trade (NT) and turnover ratio (TR) in the pre-crisis period. However, in both the pre-crisis and post crisis periods an insignificantly negative relationship between NOSHCO and trading volume. This means that cross- holdings ownership has a marginally negative impact on market liquidity. Similar, results are also found with respect to employee ownership (NOSHEM). With respect to other holdings (NOSHOF) the findings reveal an insignificantly positive relationship between NOSHOF and proportional bid-ask spread (PBAS), and insignificantly negative relationship between NOSHOF and number of trades (NT) in the pre-crisis period.

Furthermore, regarding the free float shares the findings show an insignificantly positive relationship between market liquidity and free float shares (NOSHFF). More, specifically, an insignificantly negative relationship is observed between NOSHFF and proportional bid-ask spread (PBAS) in both the crisis and post-crisis periods. The findings also suggest an insignificantly positive relationship between NOSHFF and the turnover ratio (TR), number of trades (NT) and trading volume (VO) in both the pre-crisis and post-crisis periods. These finding thus suggest there a positive relationship between free float share and market liquidity in the both pre-crisis and post crisis periods.

7.5 Limitations of the Research

This thesis has been empirically and theoretically conducted on a systematic basis with continuous reviews contributed by qualified and specialised supervisors and independent reviewers from different annual doctoral conferences. However, there are potential theoretical and methodological limitations of this study, which are worth noting, and therefore the findings should be interpreted with awareness of these potential limitations. The main delimitations that are presented in this study are mostly methodological in nature and can be grouped into three categories: namely, theoretical and empirical delimitations, inherent data and sample limitations and constructs and variables' limitations.

7.5.1 Theoretical and Empirical Delimitation

An important limitation that should be taken into account is in identifying the theoretical and empirical implications of the findings of this study. It should be noted that there are diverse and contrasting theories, hypotheses and approaches in the area since the existing variations in institutions of corporations have been established over time and it is not possible to rely on

particular theoretical interpretations. The general premise of this study suggests that market liquidity can be used as an indicator of the adverse selection effect. Accordingly, the study does not provide a comprehensive evaluation of the role of governance mechanisms in market liquidity. Therefore, the reader should be aware of the danger of generalising the findings of this study on all aspects of corporate governance mechanisms and it is suggested that it should be interpreted according to the particular aspects used in this study. For example, while this study, among others, found that insider ownership plays an inverse role in market liquidity, recent studies have emphasised the role of insiders' identity ownership on market liquidity (Chtourou et al., 2001; Peasnell et al., 2003; Yu 2008). However, considerable attempts are made to overcome these limitations by determining the way guided by the insights of related studies and the consistencies of the evidences contained in those similar studies. Equally, some of the provisions of the Code are also an excellent indication of the relevance and contribution of this study to the existing literature.

7.5.2 Data and Sample Limitations

For a number of reasons, it is difficult for studies in ownership level, concentration and owners' identity and market liquidity that utilise a UK-based sample to randomly select samples. For example, there are a limited number of UK firms that provide sufficient and relevant ownership and market liquidity variables and release their information publicly. In addition, some of the UK Corporate Governance Code requirements give exemptions to smaller firms whilst some of the provisions do not apply to firms that are not large enough to feature in the FTSE 350. As a result, this study sample was selected based on pre-set criteria and therefore consists of a non-random selection. Such a selection method probably leads to an inherent sampling bias and hence to possibly inaccurate associations that are generated from the sample composition.

Moreover, due to the different nature of their accounting practices and the different regulations that guide their trading and governance practices, financial and investment firms were excluded from the study sample. This exclusion may lead to a problem in generalising the findings to other sectors and indices within the UK. Another problem with generalisation may arise in terms of using UK-based data to offer any insights into other geographic areas. That is, since other countries have different cultures, codes, idiosyncratic practices, economic aspects, and capital markets in terms of firms with different sizes and demands for high-quality executives, care should be taken with regard to generalising the findings of this study to firms in other countries.

Nevertheless, the similarity of this study's results with those of studies using US data implies a high degree of generalisation may be possible with regard to these findings. Additionally, the importance of such study on the UK business environment comes from the crucial role that UK corporate governance plays in the field of global business regulations and practices as a respected leader in the global business community. That is, many of the governance and disclosure regulations of other countries, including those of the US, are largely inspired by those of the UK. Overall, the problems relating to data and sample limitation stated above are ones I ultimately chose to live with following similar related studies. I have stated such limitations in the analysis and the necessary delimitation this results in does not in my view detract from the validity of the study.

7.5.3 Constructs and Variables' Limitations

Although this study mainly relies on previous theoretical and empirical works in constructing the empirical models and measuring the variables, some related limitations should be taken into consideration. In terms of independent variables, all ownership variables were collected and measured in a straightforward way, since they were provided in the annual reports and BoardEx. However, in some cases, the total liquidity costs contained some components that might be measured inaccurately. For example, the adverse selection component of the bid-ask spread needs a 'high-frequency data'. However, due to the lack of disclosure about information with regard to this component this study measures the low frequency measures of market liquidity.

In terms of control variables, even though this study employs a number of variables to control for the determinants of market liquidity, it is highly possible that other factors not controlled in this study's analyses will affect the level and the structure of market liquidity; for instance, the analyst earning forecast; this exclusion is mainly due to the lack of data availability and the access to I/B/E/S file. Nevertheless, according to previous theoretical and empirical works, it can be claimed that the control variables that are included in this study's analysis cover the most important firm-specific determinants. Finally, examining only a specific set of ownership structure is a limitation that should be taken into consideration when interpreting the results of the analyses. That is because, if other ownership variables affect the level and the structure of market liquidity, the parameter estimates may be biased.

7.6 Research Implications

The findings of this study should be of particular interest to market participants such as investors, company managers and market makers and regulators. The results of this study provide new insights in this area which cover the implications of ownership level, concentration and owners' identity on market liquidity. In particular, the evidence presented in Chapter 4 shows that market liquidity is adversely affected by ownership concentration and insider ownership. This finding would help investors and portfolio managers in the formation of their investment strategies, to coincide their trading with those firms where market liquidity is expected to be high. The findings would also help them to achieve higher gains through avoiding high transaction costs, which may result when the market becomes illiquid in adverse market and macroeconomic conditions.

Furthermore, the findings presented in Chapter 5 in relation to the effects of owners' identity on market liquidity will help both investors and managers to manage their portfolio even more efficiently. The findings indicate that the identity of owners' affect market liquidity in different ways. First, portfolio managers and market maker would know that the insider (i.e. executive and non-executive director) who is better informed about the firm's private information and as a result may trade upon this information, which would reduce market liquidity. In contrast, the findings also reveal that different outsider identities of shareholders have different effects on market liquidity. For example, free floats shareholders increase market liquidity whereas controlled shareholders (such as, employees, banks, pension funds etc.) would reduce market liquidity. Second, findings on the effect of owners' identity on market liquidity may also be a useful factor in the decision - making process of investors and portfolio managers who try to select the right stocks to trade and hold in their portfolio. They will direct their attention towards selecting stocks that expose them to low levels of ownership concentration, which are the stocks with low levels of controlled shareholders. In brief, the evidence provided in this study is expected to be of great importance and interest in the investment spectrum.

In addition, the findings of this research would also benefit, firm managers (i.e. financial managers) policy makers and practitioners. For companies that are considering raising more external capital, raising cash will be easier, and liquidity risk will be lower during the time when the market is highly liquid. The findings of chapter 4 and 5 suggest that while deciding about the right time to gain access into the market, financial managers should base their decisions on

certain input variables, such as proportion of concentrated ownership and free float shares. Also, the findings concerning the relationship between owners' identity and market liquidity could provide financial managers with new insights into the question of their market maker policies: if a firm's stocks are held by executive and non- executive directors and controlled shareholders, market markets are required to implement new liquidity-increasing financial policies to improve the liquidity of their stocks and thus reduce the transaction costs. Similarly, these findings would also be useful for the practitioners because it would help them in their forecasting and recommendations to their clients.

A further policy implication of this study is related to the corporate disclosure policy about the ownership of firms. The findings indicate that firms should pay more attention to their ownership structure disclosure policy and improve quality of the disclosed information as much as possible. A poor disclosure policy might be the reason for deteriorating stocks' liquidity, especially when investors are reluctant to hold or trade in stocks that have low liquidity levels and where poor quality firm-specific information is available to the market. Therefore, a firm's executives will make decisions to invest more in the quality of their disclosure policy, which would help in improving activities about investors' relationships. This will result in a lower level of information asymmetry between company managers and outside investors and would therefore reduce the level of divergence of opinion among investors. In addition, findings of Chapter 6 suggest a better disclosure policy will not only help improve market liquidity in normal trading periods but would also help improve a firm's liquidity in timings when the market is down. This leads to lower transaction costs and an increase in the amount of funds raised, by gaining easy access to financial markets.

7.7 Key Areas for Future Research

Although the findings of this study provide evidence that the ownership variables and its identity play a significant role in determining the level of market liquidity, some features exist that are not covered by this study but which could be relevant to the issue of market liquidity determinants. One attractive area for future research is investigating additional corporate governance characteristics that may affect market liquidity. An example of such additional tests would be investigating the impact of board size, independence, chairman and non-directors' commitment in determining market liquidity. As mentioned earlier, the findings of this study reflect the role of ownership and its identity in determining market liquidity.

Thus, it might be difficult to generalise the findings to reflect all firms' aspects. Therefore, investigating the effects of these attributes on other business aspects such as firm earnings management and analyst's coverage could help in determining the exact impact of these ownership structures in controlling public firms and determining the level of market liquidity. Similarly, the examination of the impact of ownership level, concentration and owners' identity is predicted to help further clarify whether these variables encourage the market liquidity to increase the firm's value. Particularly, it would be interesting to conduct more focused investigation on the impact of ownership structure on market liquidity and how the market liquidity can affect the firm value.

In terms of the impact of ownership structure, the findings with regard to chairs' shareholder ownership shed some light on the negative impact of executive and non-executive ownership on market liquidity. For instance, investigating the role of the directors' identity would provide us with a new insight into the role of directors' identity on market liquidity. Moreover, the lack of findings with respect to the role of institutional ownership in market liquidity in this study might have been caused by the fact that no difference was acknowledged between institutional investors in terms of their investment horizons. Therefore, examining the role of institutional investors with regard to market liquidity after classifying them into long-horizon and short-horizon investors might help to explain the passive role of institutional investors in the UK.

Another interesting avenue for further research would be conducting a comparative study between the US and UK firms in terms of the impact of ownership structure and its identity on determining market liquidity. A comparative panel data research between these countries with regard to the role and effect of ownership and its identity on market liquidity would provide an interesting contribution to the field. Moreover, it might be interesting to perform a comparative study between the one-tier and two-tier board systems of an Anglo-Saxon and a Continental European country's firms respectively on the impact of the ownership structure and its identity on market liquidity. In addition, a replication of this study utilising wider stock market data from different countries would be helpful in discovering an insight into the response of different environments to the phenomenon of ownership structure and market liquidity. Furthermore, as this study excludes some sectors, an opportunity might arise for further research into the impact of ownership structure and its identity on market liquidity in financial and investment firms.

Finally, although this study has totally relied on a quantitative method to investigate the relationships between market liquidity and ownership structure and its identity as this method is more relevant to achieve the research objectives, also employing a qualitative method in the form of elite interviews to investigate the subject matter in order to get the perceptions of all the stockholders would have been further informative. Therefore, as the literature that reports investigations into the relationship between ownership structure and market liquidity has mainly utilised quantitative approaches, supplementing these empirical investigations by using interview data would potentially increase the reliability and the validity of the results and therefore make a worthwhile contribution to our understanding of this area.

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